

Air Permit Review

Permit Issue Date:
CDS No. 377100039

Region: Mooresville Regional Office
County: Gaston
NC Facility ID: 3600039
Inspector's Name: Tony McManus
Date of Last Inspection: 08/12/2005
Compliance Code: 5/Meeting Compliance Schedule

Facility Data			Permit Applicability (this application only)
Applicant (Facility's Name): Duke Power Company LLC - Allen Steam Station Facility Address: Duke Power Company LLC - Allen Steam Station 253 Plant Allen Rd. Belmont, NC 28012 SIC: 4911 / Electric Services NAICS: 221112 / Fossil Fuel Electric Power Generation Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: 2D .0501(e) .0510, .0521, .0540 NSPS: OOO NESHAP: PSD: PSD Avoidance: NC Toxics: H ₂ S 2D.1100 112(r): Other:
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 3600039.06B&C Date Received: 04/12&25/2006 Application Type: Modification Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 03757/T29 Existing Permit Issue Date: 01/19/2006 Existing Permit Expiration Date: 10/31/2008
Donald Scruggs Environmental Coordinator (704) 829-2350 253 Plant Allen Road Belmont NC, 28012	Stephen Immel Regional Manager Allen Steam Station Belmont NC, 28012	William Horton Senior Scientist (704) 373-3226 526 S. Church Street Charlotte NC, 28202	
Review Engineer: Michael Brandon, P.E.		Comments / Recommendations:	
Review Engineer's Signature:		Issue 03757/T30	
Date: 4/27/06		Permit Issue Date:	
		Permit Expiration Date: 10/31/08	

1. Purpose of Application:

Duke Power is submitting application 360039.06B to comply with former specific condition 2.1 A.1.c.i.(A) of permit T29 for the installation of sulfur dioxide controls to comply with the ambient air quality standards and to change the name from *Duke Energy Corporation* to *Duke Power Company LLC*.

The application is for the following equipment;

Sulfur Dioxide Flue Gas Control

- a. limestone spray tower scrubber (ID No. CDU1/2/5FGD) for boilers 1, 2, and 5 (ID Nos. ES-1, ES2, and ES-5),
- b. limestone spray tower scrubber (ID No. CDU3/4FGD) to boilers 3 and 4 (ID Nos. ES-3 and ES-4).

Limestone Receiving, Handling, Storage, and Preparation

- c. fabric filter (ID No. CDRULBF) on:
 - i. railcar transfer to duel hopper (ID No. ES-8-1),
 - ii. dual hopper transfer to hopper conveyor No.1 (ID No. ES-8-2A)
 - iii. dual hopper transfer to hopper conveyor No. 2 (ID No. ES-8-2B) and
 - iv. hopper conveyors No. 1 and No. 2 transfer to transfer tower stock pile conveyor(ID No. ES-8-3);
- d. transfer tower stock pile conveyor transfer to stockpile stack out conveyor in transfer tower (ID No. ES-9);
- e. stock pile stack out conveyor to stock pile & stock pile (ID No. ES-10);
- f. stock pile transfer to grate feed of stock pile reclaim conveyor (ID No. ES-11A);
- g. grate feeder transfer to stock pile reclaim conveyor (ID No. ES-11B)
- h. stock pile reclaim conveyor transfer to preparation plant feed conveyor (ID No. ES-12);
- i. fabric filter (ID No. CDLSBF) on:
 - i. preparation plant feed conveyor with flop gate transfer to day bin No. 2 feed conveyor (ID No. ES-13),
 - ii. preparation plant feed conveyor with flop gate transfer to day bin No. 1 (ID No. ES-14), and
 - iii. day bin No. 2 feed conveyor to day bin No. 2 (ID No. ES-15);

- j. day bin No. 1 transfer to wet ball mill No. 1 in preparation building (ID No. ES-16);
- k. day bin No. 2 transfer to wet ball mill No. 2 in preparation building (ID No. ES-17);
- l. wet ball mill No. 1 and product classifier in preparation building (ID No. ES-18A); and
- m. wet ball mill No. 2 and product classifier in preparation building (ID No. ES-18B).

Wastewater Facility

- n. wastewater metals reduction bio-reactor(s) (ID No. WWTBR)

Insignificant Activities

- o. gypsum storage piles (ID No. IFGS),
- p. gypsum collection conveyor transfer to stacker conveyor at transfer tower (120 ton per hour; ID No. I19-FGTT-20),
- q. gypsum stacker conveyor transfer to storage pile (ID No. I21-FGS),
- r. 500 hp diesel-fired emergency quench pump and 515 gallon diesel storage tank (ID No. I22),
- s. 360 hp diesel-fired emergency fire pump and 100 gallon diesel storage tank (ID No. I23), and
- t. wastewater treatment facility lime silo with fabric filter (ID No. I24).

The lime silo was evaluated based on an estimated potential through put of lime necessary for the facilities needs. Using the AP-42 factor for truck loading of 0.61 pounds per ton of lime (11.17-4) and 11,100 tons per year, the estimated uncontrolled emissions would be 3.4 tons per year. Actual usage would be only about 7,400 tons resulting in 2.3 tons per year.

In addition the above, Duke Power is submitting application 360039.06C to install selective non-catalytic reduction (SNCR) control (ID No. CD-3b) on unit 2 (ID No. ES2-) and SNCR (ID No. CD-10c) on unit 5 (ID No. ES-5) for NOx control.

Changes to the Title V permit are as follows:

Page	Section	Change
na	all	Duke Energy Corporation name changed to Duke Power Company LLC.
na	Insignificant activities	The following sources were removed from the cite: 1. Transformer oil maintenance storage tank, 27000 gallon 2. Breaker oil maintenance storage tank, 10000 gallon 3. Circuit breakers in 230 Kv switchyard, containing 340 gallons of oil that is contaminated with PCBs.
na	Insignificant activities	The applicant requested that the limestone belt scale calibration/emergency backup reclaim front-end loader process be placed on the insignificant activity list. Since this is specifically exempt from NSPS, it has been included and assigned the ID No. ILSR. The hydrazine storage tank capacity was corrected from 75 to 250 gallons.
na	Insignificant activities	Gypsum handling and storage emissions sources were determined to be insignificant and added as follows: gypsum storage piles (ID No. IFGS), gypsum belt scale calibration (ID No. IGBSC), gypsum emergency loading (ID No. IGUL), gypsum collection conveyor transfer to stacker conveyor at transfer tower (120 ton per hour; ID No. I19-FGTT-20), gypsum stacker conveyor transfer to storage pile (ID No. I21-FGS). Two emergency were determined to be insignificant and added as follows: 550 bhp diesel-fired emergency quench pump and 515 gallon diesel storage tank (ID No. I22) and 360 diesel-fired emergency fire pump and 100 gallon diesel storage tank (ID No. I23). The wastewater treatment facility lime silo with fabric filter (ID No. I24) was determined to be insignificant and was added.

Page	Section	Change
		Three liquid urea storage tanks; 23, 264 gallons each (ID Nos. ILU1, ILU2, and ILU3) were added.
3-5	Part I, Section 1	Added SO ₂ scrubber (ID No. CDU1/2/5FGD) to boilers 1, 2, and 5 (ID Nos. ES-1, ES2, and ES-5).
3-4	Part I, Section 1	Added SO ₂ scrubber (ID No. CDU3/4FGD) to boilers 3 and 4 (ID Nos. ES-3 and ES-4).
4	Part I, Section 1	Added SCNR (ID No. CD-3b) to unit 2 control scenario.
5	Part I, Section 1	Added SCNR (ID No. CD-10c) to unit 5 control scenario.
5-6	Part I, Section 1	Added limestone handling, receiving and processing sources including- fabric filter (ID No. CDRULBF) on: railcar transfer to dual hopper (ID No. ES-8-1), dual hopper transfer to hopper conveyor No. 1 (ID No. ES-8-2A) dual hopper transfer to hopper conveyor No. 2 (ID No. ES-8-2B) and hopper conveyors No. 1 and No. 2 transfer to transfer tower stock pile conveyor (ID No. ES-8-3); transfer tower stock pile conveyor transfer to stockpile stack out conveyor in transfer tower (ID No. ES-9); stock pile stack out conveyor to stock pile & stock pile (ID No. ES-10); stock pile transfer to grate feed of stock pile reclaim conveyor (ID No. ES-11A); grate feeder transfer to stock pile reclaim conveyor (ID No. ES-11B) stock pile reclaim conveyor transfer to preparation plant feed conveyor (ID No. ES-12); fabric filter (ID No. CDLSBF) on: preparation plant feed conveyor with flop gate transfer to day bin No. 2 feed conveyor (ID No. ES-13), preparation plant feed conveyor with flop gate transfer to day bin No. 1 (ID No. ES-14), and day bin No. 2 feed conveyor to day bin No. 2 (ID No. ES-15); day bin No. 1 transfer to wet ball mill No. 1 in preparation building (ID No. ES-16); day bin No. 2 transfer to wet ball mill No. 2 in preparation building (ID No. ES-17); wet ball mill No. 1 and product classifier in preparation building (ID No. ES-18A); and wet ball mill No. 2 and product classifier in preparation building (ID No. ES-18B).
6	Section 1	wastewater metals reduction bio-reaction pond (ID No. WWTBR)
na	Section 1	Removed minor modification notation for No. 2 fuel oil-fired emergency diesel generator (ID No. ES-7) permitted December 10, 2005.
na	Section 1	Removed minor modification notation for Unit 4 selective non-catalytic reduction (SNCR) NO _x control system (ID No. CD-8b) permitted January 19, 2006.
na	Section 1	Removed 502(b)(10) modification notation for Unit 3 selective non-catalytic reduction NO _x control system (ID No. CD-5b) and Unit 5 separated over-fire air/lowered-fire low NO _x technologies (ID No. CD-10b).
7	Section 2.1 A.	Added spray tower scrubbers to boiler definitions and modified the regulatory applicability table to show pre scrubber operation allowable emissions (2.3 pound/million Btu heat input) and post scrubber operation allowable emissions (1.0 pound/million Btu heat input).
9	Section 2.1 A.1.c.i.	This condition was modified by removing the old 2.1 A.1.c.i.(A) provision to

Page	Section	Change
		submit an application for which this permit is being issued.
10	Section 2.1 A.1.e. (new provision)	This is a new provision for enforceable SO ₂ emission rates of 1.0 pounds per million Btu heat input established pursuant to the requirement of old Section 2.1 A.1.c.i.(A) of the previous permit (now removed). Monitoring, recordkeeping, and reporting requirements are identical to the conditions of 2.1 A.2. for 15A NCAC 2D .0516.
11	Section 2.1 A.2.a.	This condition was modified to cross reference the new SO ₂ emission rate that will supersede 15A NCAC 2D .0516.
12-13	Section 2.1 A.4.d. Section 2.1 A.6.b. Section 2.1 A.8.a.	Stack bypass opacity monitoring exemption language was included.
16	Section 2.1 A.9.a	The TAP ammonia emissions limits for Units 15 were updated to reflect the newly modeled rates.
17	Section 2.1 A.10.e.	NO _x emissions reports were changed from semi annually to annually pursuant to the rule change for 2D .1404(g).
21-22	Section 2.1 D.	Applicable requirements were added for Lime Stone, Receiving, Storage, Transfer, and Grinding subject to new source performance standards for non-metallic minerals processing (40 CFR 60, Subpart OOO).
23	Section 2.1 E.	Applicable requirements were added for Lime Stone, Receiving, Storage, Transfer, and Grinding exempt from new source performance standards for non-metallic minerals processing.
24	Section 2.2 A.	Added Section 2.2 for "Multiple Emission Sources" for 15A NCAC 2D .0510: PARTICULATES FROM SAND, GRAVEL, OR CRUSHED STONE OPERATIONS - 2.2 A.1.; and 15A NCAC 2D .0540: PARTICULATES FROM FUGITIVE NON-PROCESS DUST EMISSION SOURCES -2.2 A.2.
26	Section 2.2 B.	Added Section 2.2 for Facility Wide Modeled TAP emissions.
26	Section 2.3	Recodified Section 2.2 in previous permit.
27-28	Section 2.4	Recodified Section 2.3 in previous permit.
30-35	Section 3	General Conditions were updated as follows: G.2. added 2Q.0505 as a regulatory citation; I.A.2. added some language regarding excess emissions reporting; and the citation in KK.3. was corrected from .1806 to .0522. LL. was not added for non operating equipment as special dispensation was given to DUKE by the Permits Section to exclude it from this permit, and the permits for all of their other facilities and all future permits. This was done June 3, 2003 for the initial Title V for the Marshal plant (3676T27).
36-37	Part II	Added new control equipment and emission sources from application 3600039.06B received April 12, 2006 and 3600039.06B received April 25, 2006, to construction conditions.
37-38	Part II Section 2	Added NSPS OOO initial performance testing and reporting requirements to construction conditions.

2. Application Chronology:

The application chronology is detailed on the attached IBEAM Report.

3. New Equipment/Change in Emission and Regulatory Review

a. Flue Gas Desulfurization

limestone spray tower scrubber (ID No. CDU1/2/5FGD) for boilers 1, 2, and 5 (ID Nos. ES-1, ES2, and ES-5), and limestone spray tower scrubber (ID No. CDU3/4FGD) to boilers 3 and 4 (ID Nos. ES-3 and ES-4).

The scrubbers were designed to reduce sulfur dioxide emissions from 3.5 to 0.175 pound per million Btu based on a control efficiency of 95 percent provided by the vendor. However, the allowable emission will only be reduced from 2.3 to 1.0 pounds per million Btu heat input, or a minimum of 56.5 percent control efficiency because emissions modeled at this rate demonstrate compliance with the NAAQS. The potential paper reduction of sulfur dioxide emissions (2.3 to 1.0 pounds per million Btu heat input) is about 80,456 tons per year. The potential to actual (average of reported 2003/2004 emissions) emissions decrease is 32,902 tons per year. Daniel A. Markley, registered professional engineer in the State of North Carolina, certified these control devices.

The applicable regulation for the scrubber addition 15A NCAC 2D .0501(e) - Control Equipment for Compliance with National Ambient Air Quality Standards. Ambient dispersion modeling conducted based on the new emission rate and the new stack configuration shows that the 3-hour, 24-hour and annual National Ambient Air Quality Standards for sulfur dioxide will be met. The second high value for the 3-hour average impact is 45 percent of the standard; the second high value for the 24-hour average impact is 53 percent of the standard, and the first high value for the annual average impact is 41 percent of the standard. The utility boilers were the only sulfur dioxide emission sources modeled.

PM-10/TSP emissions were modeled from the utility boilers to demonstrate that emissions from the new stack would continue to protect ambient air quality standards as demonstrated for the old stacks under the SIP particulate emission rates of 2D .0536. The Air Quality Analysis Branch reviewed and approved the modeling in a memorandum dated **MAY ??, 2006**

The applicable regulation for the addition of new scrubbers' stack is 15A NCAC 2D .0533 (two flue one stack). This limits the height of the stack used in determining compliance with the NAAQS. Since the stacks are new, they may not be constructed higher than the "Good Engineering Stack Height" of 375 feet as determined by BPIP prime for building dimensions and downwash effects. The actual stack height will be 365 feet.

b. Limestone Receiving, Handling, Storage, and Preparation

fabric filter (ID No. CDRULBF) on:

dual hopper transfer to hopper conveyor No. 1 (ID No. ES-8-2A)

dual hopper transfer to hopper conveyor No. 2 (ID No. ES-8-2B) and

hopper conveyors No. 1 and No. 2 transfer to transfer tower stock pile conveyor (ID No. ES-8-3);

stock pile transfer to grate feed of stock pile reclaim conveyor (ID No. ES-11A);

grate feeder transfer to stock pile reclaim conveyor (ID No. ES-11B)

stock pile reclaim conveyor transfer to preparation plant feed conveyor (ID No. ES-12);

fabric filter (ID No. CDLSBF) on:

preparation plant feed conveyor with flop gate transfer to day bin No. 2 feed conveyor (ID No. ES-13),

preparation plant feed conveyor with flop gate transfer to day bin No. 1 (ID No. ES-14), and

day bin No. 2 feed conveyor to day bin No. 2 (ID No. ES-15);

day bin No. 1 transfer to wet ball mill No. 1 in preparation building (ID No. ES-16);

day bin No. 2 transfer to wet ball mill No. 2 in preparation building (ID No. ES-17);

wet ball mill No. 1 and product classifier in preparation building (ID No. ES-18A); and

wet ball mill No. 2 and product classifier in preparation building (ID No. ES-18B).

These facilities will receive limestone, transfer it to a storage pile, retrieve it from the storage pile and send it to the wet ball mills for grinding and reagent preparation for use in the sulfur dioxide abatement scrubbers.

The applicable regulations are:

2D .0510 - Particulates from Sand, Gravel, or Crushed Stone Operations

2D .0524 - New Source Performance Standards for Non-Metallic Minerals Processing (40 CFR 60, Subpart OOO)

2D .0540 - Particulates from Fugitives Non-Process Dust Emission Sources

2D.0510

This regulation requires the Permittee to comply with 2D .0540 and control process generated emissions to achieve compliance with the 2D .0521 opacity standards and, for the above sources, the NSPS for Non-Metallic Minerals Processing under 2D .0524.

2D.0524

The new source performance standards require emissions from a stack or building vent housing a non-metallic mineral process not exceed a visible emission of seven percent opacity and a particulate emission rate of 0.022 grains per dry standard cubic foot. It applies to both baghouse stacks and any building vents on the conveyor transfer tower and reagent preparation building. The standards also require that no fugitive emission shall exceed 10 percent opacity and that the buildings housing non-metallic minerals processes shall have no fugitive emissions.

Initial testing requirements of the NSPS are contained in PART II of the permit and include EPA reference methods 5 or 17 for PM emissions and methods 9 and 22 for opacity. Monitoring includes inspection and maintenance of the control equipment and monthly opacity checks of each transfer point, stack emissions, building vent, and building structure.

2D.0540

This regulation states that fugitive non-process dust emissions (i.e., particulate matter that is not collected by a capture system and is generated from areas such as pit areas, process areas, haul roads, stockpiles, and plant roads) may not cause or contribute to substantive complaints. If complaint is received, the Permittee must abate the emissions, and if a subsequent complaint is received within 90 days the DAQ may require that a control plan be developed and submitted.

c. Limestone Receiving, Handling, Storage, and Preparation

railcar transfer to dual hopper (ID No. ES-8-1) with fabric filter (ID No. CDRULBF)
transfer tower stock pile conveyor transfer to stockpile stack out conveyor in transfer tower (ID No. ES-9);
stock pile stack out conveyor to stock pile & stock pile (ID No. ES-10);

The applicable regulations are:

2D .0510 - Particulates from Sand, Gravel, or Crushed Stone Operations

2D .0521 - Control of Visible Emissions

2D .0540 - Particulates from Fugitives Non-Process Dust Emission Sources

2D.0510

This regulation requires the Permittee to comply with 2D .0540 and control process generated emissions to achieve compliance with the NSPS for Non-Metallic Minerals Processing under 2D .0524 and, for the above sources, the 2D .0521 opacity standards.

2D.0521

These sources are specifically exempt from the new source performance standards for non-metallic minerals processing because of the definition of transfer point that excludes putting material on a stock pile and 40 CFR 63.672(d) which exempts material being reclaimed from a stock pile by truck (front end loader or railcar) dumping into a feed hopper. These emissions points must meet the 20 percent opacity standard.

2D.0540

This regulation states that fugitive non-process dust emissions (i.e., particulate matter that is not collected by a capture system and is generated from areas such as pit areas, process areas, haul roads, stockpiles, and plant roads) may not cause or contribute to substantive complaints. If complaint is received, the Permittee must abate the emissions, and if a subsequent complaint is received within 90 days the DAQ may require that a control plan be developed and submitted.

d. wastewater metals reduction bio-reactor (ID No. WWTBR)

This source will have potential emissions of more than five tons but less than 10 tons per year of hydrogen sulfide. It is a significant source for the state only toxic air pollutant requirements. Impact from the reduction of selenium sulfide is anticipated to create about 31.75 pounds per day of hydrogen sulfide. The single source modeled impact at this emission rate is 59 percent of the acceptable ambient level (five years modeled). The modeled emission rate was scaled up to 95 percent of the acceptable ambient level and stated as 51 pounds per day. The vendor study shows a conversion of molecular sulfur from sulfate to molecular sulfur in hydrogen sulfide of about 0.227 mole percent. 51 pounds per day of H₂S is 1.5 moles of sulfur, which relates to an unconverted sulfur inlet of 660.8 moles. 660.8 moles of sulfur is 63,436 pounds of sulfate per day. At a maximum, concentration of 4,000 milligrams per liter, the flow rate would be about 1,320 gallon per minute. Max flow to the system will be about half, and the concentration much less than 4,000 mg/l. Therefore, at the higher modeled concentration, no monitoring, recordkeeping, or reporting is required. The Air Quality Analysis Branch reviewed and approved the modeling in a memorandum dated **MAY ??, 2006**

e. Selective Non-Catalytic Reduction

SNCR (ID No. CD-2b) for Unit 2 (ID No. Es-2)

SNCR (ID No. CD-10c) for Unit 5 (ID No. ES-5)

These NO_x reduction control devices are being installed to help meet the tonnage-based targets of the North Carolina Clean Smokestacks Legislation. The units are expected to achieve an emission rate of about 0.17 pounds of NO_x per million Btu heat input, or a 32 percent additional reduction of uncontrolled emissions over the boiler modifications for separated over-fire air (SOFA) and lowered-fire (LOFIR) low NO_x burners. The devices will inject urea into the flue gas in the 1600° to 2300°F temperature zone where the ammonia dissociates from the urea creating a reducing atmosphere. Under this condition the NH₃ and NO_x are converted to water and elemental nitrogen. However, not all the ammonia will react and some will be emitted to the atmosphere. Previous study on ammonia slip reveal that 80 to 90 percent is retained on the boiler fly ash and that exist concentration due to the slip alone is only about 6 to 8 ppmv. Emissions of ammonia will increase by about 2.2 pounds per hour for Unit 2 and 4.96 pounds per hour from Unit 5. Unit 5 emissions are greater because they include ESP flue gas conditioning ammonia. Daniel A. Markley, registered engineer in the State of North Carolina, has certified these control devices.

Emission were modeled from all five units to determine compliance with acceptable ambient concentration for ammonia of 2.7 mg/m³ (15 A NCAC 2D .1100) and found to have an impact of less than one percent of the AAL. The emissions modeled and included the Section 2.1 A.9. table. The AQAB reviewed the modeling and concurred with the analysis in a memorandum dated May 18, 2006. The emission rates (below) modeled include ammonia contributions from coal combustion, and flue gas conditioning, where applicable.

Ammonia Emissions in pounds per hour

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
2.245	2.245	22.416	22.416	22.416

4. Facility Compliance Status:

The facility is presently under an SOC to achieve compliance with NAAQS.

5. Facility Emissions Review:

Potential emission increases due to the proposed modifications are:

- 9.3 tons per year of H₂S (allowable emissions)
- 10.2 tons per year of PM-10,
- 19.2 tons per year of PM, and
- 19.28 pounds per hour of ammonia (85.4 tons per year)

The Potential decrease of sulfur dioxide emissions is 32,902 tons per year and the potential decrease of NO_x emissions is 1,882 tons per year.

6. Public Notice/EPA

The proposed permit is subject to a 30-day public notice and a concurrent 45-day EPA review period because of the addition of an enforceable SO₂ emission limit.

7. Conclusions, Comments, and Recommendations:

The applicant request the addition of the following insignificant sources: 9,500 pound anhydrous ammonia tank; 8,500 gallon sulfuric acid tank; 8,500 gallon sodium hydroxide tank; 6,000 gallon sodium hydroxide tank and 8,500 gallon ferric sulfate tank. However, these are tanks are not considered emissions sources because they are either pressure tanks or the substance has no vapor pressure do not belong on the insignificant activity list.

The PM-10 Increment consumption from the new sources is 2.33 pounds per hour.

The RCO and MRO recommend issuance of permit revision 3757T30.