

## Air Permit Review

**Permit Issue Date:**  
**CDS ID No. 3714500045**

**Region:** Raleigh Regional Office  
**County:** Person  
**NC Facility ID:** 7300045  
**Inspector's Name:** Steve Hall  
**Date of Last Inspection:** 04/19/2006  
**Compliance Code:** 3/In Compliance - Inspection

<b>Facility Data</b>			<b>Permit Applicability (this application only)</b>	
<b>Applicant (Facility's Name):</b> Progress Energy - Mayo Facility <b>Facility Address:</b> Progress Energy - Mayo Facility 10660 Boston Road Roxboro, NC 27574 <b>SIC:</b> 4911 / Electric Services <b>NAICS:</b> 221112 / Fossil Fuel Electric Power Generation <b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>SIP:</b> 2D .0533, .0510, .0521, .0540 <b>NSPS:</b> Subpart OOO <b>NESHAP:</b> <b>PSD:</b> <b>PSD Avoidance:</b> <b>NC Toxics:</b> <b>112(r):</b> <b>Other:</b>	
<b>Contact Data</b>			<b>Application Data</b>	
<b>Facility Contact</b>	<b>Authorized Contact</b>	<b>Technical Contact</b>	<b>Application Number:</b> 7300045.06A <b>Date Received:</b> 05/31/2006 <b>Application Type:</b> Modification <b>Application Schedule:</b> TV-Significant <b>Existing Permit Data</b> <b>Existing Permit Number:</b> 03478/T26 <b>Existing Permit Issue Date:</b> 06/01/2005 <b>Existing Permit Expiration Date:</b> 08/31/2008	
Dulcie Phillips Senior Environmental Specialist (919) 597-7331 10660 Boston Road Roxboro NC, 27574	Robert Beasley Plant Manager (919) 597-7331 10660 Boston Road Roxboro NC, 27574	Earl Enzor Lead Environmental Specialist (919) 546-2136 PO Box 1551 Raleigh NC, 27601		
<b>Review Engineer:</b> Michael Brandon P.E.			<b>Comments / Recommendations:</b>	
<b>Review Engineer's Signature:</b> _____ <b>Date:</b> _____			<b>Issue 03478/T27</b> <b>Permit Issue Date:</b> <b>PROPOSED</b> <b>Permit Expiration Date:</b> 8/31/08	

### 1. Purpose of Application:

The application is for the following equipment;

Sulfur Dioxide Flue Gas Control

- a. A flue gas desulfurization limestone slurry tray tower scrubber (ID No. SCRUBBER) for UNIT 1A BOILER and UNIT 1B Boiler

Limestone Receiving, Handling, Storage, and Preparation

- b. receiving and storage pile (ID No. LSRSP),
- c. reclaim hopper transfer and belt feeder L1 (ID No. LSL1),
- d. belt feeder L1 transfer and conveyor L2 (ID No. LSL2),
- e. head chute gate transfer housing for conveyor L2 transfer to conveyor L3 (ID No. LSL2HCG) with fabric filter (ID No. CDLS2HCG)
- f. conveyor L3 (ID No. LSL3),
- g. conveyor L3 transfer and storage silo (ID No. LSS1A) with fabric filter (ID No. CDLSS1A),
- h. head chute gate transfer and storage silo (ID No. LSS1B) with fabric filter (ID No. CDLSS1B),
- i. wet ball mill grinders (ID Nos. LSG1 and LSG2)

Wastewater Facility

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

Insignificant Activities

- k. emergency quench water pump; 817 hp (ID No. IQWP) MACT ZZZZ initial Notification only
- l. limestone pile reclaim hopper (ID No. LSRH)
- m. gypsum reversing conveyor (ID No. IG1A)
- n. gypsum reversing conveyor (ID No. IG1B)

- o. gypsum conveyor from G1A/G1B to the stacking conveyor (ID No. IG2)
- p. gypsum stacking conveyor (ID No. IG3)
- q. gypsum storage pile (ID No. IGSP)
- r. gypsum truck load out (ID No. IGTL)

Changes to the Title V permit are as follows:

Page	Section	Change
NA	Insignificant Activity	Added the emergency quench pump (ID No. IQWP), limestone pile reclaim hopper (ID No. ILSRH), gypsum reversing conveyor (ID No. IG1A), gypsum reversing conveyor (ID No. IG1B), gypsum conveyor from G1A/B to the stacking conveyor (ID No. IG2), gypsum stacking conveyor (ID No. IG3), gypsum storage pile (ID No. IGSP), and gypsum truck load out (ID No. IGTL).
8	1 -equipment list	A flue gas desulfurization limestone slurry tray tower scrubber (ID No. SCRUBBER) was added as a control device for UNIT 1A BOILER and UNIT 1B Boiler.  The following significant activities were added; receiving and storage pile (ID No. LSRSP), reclaim hopper transfer and belt feeder L1 (ID No. LSL1), belt feeder L1 transfer and conveyor L2 (ID No. LSL2), head chute gate transfer housing for conveyor L2 transfer to conveyor L3 (ID No. LSL2HCG) with fabric filter (ID No. CDLS2HCG), conveyor L3 (ID No. LSL3), conveyor L3 transfer and storage silo (ID No. LSS1A) with fabric filter (ID No. CDLSS1A), head chute gate transfer and storage silo (ID No. LSS1B) with fabric filter (ID No. CDLSS1B), wet ball mill grinders (ID Nos. LSG1 and LSG2), and the wastewater treatment bioreactor (ID No. WWTBR)
15-16	2.1 B.	<b>Old Section 2.1 D.</b> [sodium carbonate storage silo (ID No. SILO7) with bin vent filter (ID No. BF6)] and <b>old Section 2.1 E.</b> [dry flyash transportation system (ID No. PFTS1) with transfer cyclone (ID No C1) and fabric filter (ID No. BF4) and dry flyash transportation system (ID No. PFTS2) with transfer cyclone (ID No C2) and fabric filter (ID No. BF5)] were combined with <b>Section 2.1 B.</b> [flyash storage silo (ID No. SILO1) and associated bagfilter (ID No. BF1)] because the MRR are identical.
17-18	2.1 C.	<b>Old Section 2.1 F.</b> [coal crusher (ID No. CRUSHER) and associated conveyor drop points (ID Nos. CV2, CV9A and CV9B) with bagfilter (ID No. BF3)] was combined with <b>Section 2.1 C.</b> [five coal storage silos (ID Nos. SILO2 through SILO6) with bagfilter (ID No. BF2)] as the MRR are identical.
18-19	2.1 D.	<b>Old section 2.1 G.</b> [coal unloading operation with wet suppression (ID No. COALDUMP)] and <b>old Section 2.1 H.</b> [eleven coal conveyors (ID Nos. CV2, CV5, CV6, CV9A, CV9B, CV10A, CV10B, CV12A, CV12B, CV13A and CV13B)] were combined and recodified as <b>Section 2.1 D.</b> because the MRR are identical.
19-20	2.1 E.	Old Section 2.1 I. was recodified Section 2.1 E.
	NA	Old Section 2.1 J. for the No. 2 fuel oil tank (12, 450 gallons) was removed. The tank is not subject to NSPS Kb because the tank is less than 75 cubic meters (19,8109 gallons) and the maximum true vapor pressure of No. 2 fuel oil is less than 3.5 kPa (about 0.12 kPa). It was moved to the insignificant activities list (ID No. IST1).
20-22	2.1 F.	This section was added to address the applicable requirements for emission sources that are affected facilities under NSPS Subpart OOO.
22-23	2.1 G.	This section was added to address the applicable requirements for emission sources that are NOT affected facilities under NSPS Subpart OOO.

Page	Section	Change
23-24	2.2 A.	This section was added to address the applicable requirements for emission sources that are regulated under "Particulates From Sand, Gravel, or Crushed Stone Operations" (15A NCAC 2D .0510) and "Particulates From Fugitive Non-Process Dust Emission Sources" (15A NCAC 2D .0540).
25	2.2 B.	This section was added to address the allowable emission rate of hydrogen sulfide from the wastewater treatment bioreactor that will comply with the acceptable ambient standard of 15A NCAC 2D .1100.
25	2.3	Recodified old section 2.2
25-26	2.4	Recodified old section 2.3
27-33	General Conditions	The Part I General Conditions was updated.
34-37	Part II	Construction approval Part II was added for the new sources and control equipment.

**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 slurry tray tower scrubber (ID No. SCRUBBER) for UNIT 1A BOILER and UNIT 1B Boiler

The scrubber is designed to reduce sulfur dioxide emissions by approximately 97 percent. Sulfur dioxide emissions will be reduced to meet the Clean Smoke Stacks Act cap for the two units of 100,000 tons by 2009 and 50,000 tons by 2013. Although the stoichiometric CaCO<sub>3</sub> slurry make up rate has been determined for the estimated sulfur removal, there are no operating parameters, monitoring, recordkeeping, or reporting provided. Since reductions are apparently not required until 2009 and CEMS will be added to monitor SO<sub>2</sub>, they will probably be added at a later date (e.g., renewal November 30, 2007). Cynthia C. Winston, registered professional engineer in the State of North Carolina, certified this conceptual control device design.

The applicable regulation for the addition of new scrubber stack is 15A NCAC 2D .0533. 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" based on the formula for GEP stack height [15A NCAC 2D .0533(a)(4)(c)] is 500 feet. The formula calculation was based on the height of the Unit 1 boiler structure (200 feet) plus 1.5 times the lesser of the structure height or maximum projected width of this structure. The structure height is the lesser dimension for this calculation. The actual stack height will be 380 feet.

- b. **Limestone Receiving, Handling, Storage, and Preparation**

reclaim hopper transfer and belt feeder L1 (ID No. LSL1),  
belt feeder L1 transfer and conveyor L2 (ID No. LSL2),  
head chute gate transfer housing for conveyor L2 transfer to conveyor L3 (ID No. LSL2HCG) with fabric filter (ID No. CDLS2HCG),  
conveyor L3 (ID No. LSL3),  
conveyor L3 transfer and storage silo (ID No. LSS1A) with fabric filter (ID No. CDLSS1A),  
head chute gate transfer and storage silo (ID No. LSS1B) with fabric filter (ID No. CDLSS1B), and  
wet ball mill grinders (ID Nos. LSG1 and LSG2).

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 scrubber. Cynthia C. Winston, registered professional engineer in the State of North Carolina, certified this conceptual control device designs.

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 vents the below grade enclosure for LSL1 and LSL2, the silo transfer structure, and the 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 and Storage Pile (ID No. LSRSP)**

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 11.02 pounds per day of hydrogen sulfide. The single source modeled impact at this emission rate is 21 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 49.7 pounds per day. A vendor study shows a conversion of molecular sulfur from sulfate to molecular sulfur in hydrogen sulfide of about 0.227 mole percent. 49.7 pounds per day of H<sub>2</sub>S 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, calculated flow rate to the bioreactor would be about 1,320 gallon per minute. Max flow to the system will be much less, 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 **June ??, 2006**

**4. Facility Compliance Status:**

The facility is presently in compliance with applicable regulations and permit requirements.

**5. Facility Emissions Review:**

Potential emission increases due to the proposed modifications are:

9.07 tons per year of H<sub>2</sub>S (allowable emissions)

10.4 tons per year of PM-10,

24.8 tons per year of PM, and

**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 monitoring, recordkeeping, and reporting requirements for limestone handling fabric filters.

**7. Conclusions, Comments, and Recommendations:**

Zoning consistency was requested from the Person County zoning authority in a letter dated May 26, 2006.

The PM-10 Increment consumption from the new sources is 2.37 pounds per hour.

The RCO and RRO recommend issuance of permit revision 3478T26.