

NORTH CAROLINA DIVISION OF AIR QUALITY			Region: Fayetteville Regional Office		
Air Permit Review - 1st Time Title V consolidated with renewal application			County: Anson		
Permit Issue Date: XXXXXX			NC Facility ID: 0400050		
			Inspector's Name: Tien Nguyen		
			Date of Last Inspection: 02/19/2009		
			Compliance Code: 3 / Compliance - inspection		
Facility Data			Permit Applicability (this application only)		
Applicant (Facility's Name): North Carolina Electric Membership Corporation - Anson Plant (NCEMC - Anson)			SIP: 15A NCAC 2D .0400, 2D .0521, 2D .0524, 2D .1418, 2D .0501(e), 2Q .0501(c)(1), 2Q .0513, 2Q .0317 (of 2D .0530),		
Facility Address: NCEMC - Anson Plant 749 Blewett Falls Rd Lilesville, North Carolina 28091			NSPS: Subpart KKKK		
SIC: 4911 / Electric Services			NESHAP: N/A		
NAICS: 221112 / Fossil Fuel Electric Power Generation			PSD: N/A		
Facility Classification: Before: Title V After: Title V			PSD Avoidance: NOx and CO		
Fee Classification: Before: Title V After: Title V			NC Toxics: Sulfuric acid		
Contact Data			Application Data		
Facility Contact	Authorized Contact	Technical Contact	Application Numbers: 0400050.08A & .09B Date Received: 01/11/2008 and 08/31/2009 Application Type: Modification and Renewal Application Schedule: TV-1st Time & Renewal		
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			Existing Permit Data		
			Existing Permit Number: 09492R04		
			Existing Permit Issue Date: 03/05/2007		
			Existing Permit Expiration Date: 12/31/2009		
Consultants: ENSR Consulting & Engineering (NC), Inc.: Cathy Hawk (919) 872-6600 x 256 email: cathy.hawk@aecom.com					
Review Engineer: Booker Pullen Regional Engineer: Robert Hayden			Comments / Recommendations: Issue: 09492T05 Permit Issue Date: Permit Expiration Date:		
Review Engineer's Signature: _____ Date: October 22, 2009					

I. Introduction:

North Carolina Electric Membership Corporation-Anson Plant (NCEMC) is located in Lilesville, Anson County, North Carolina. This facility is requesting a "1st Time Title V" permit modification in application 0400050.08A. Application No. 0400050.09B (renewal) was consolidated into application 0400050.08A. The 1st time Title V permit application (0400050.08A) was received on January 11, 2008 along with the application fee (\$867.00) and was considered complete on that date. The renewal application was received on August 31, 2009 and was considered complete on that date.

These applications will go through the 30-day public notice and the 45-day EPA review in accordance with 15A NCAC 2Q .0501(c)(1).

II. Permitting History: This facility began operation in January 2007:

- A. Permit No. 09492R00 was issued on January 21, 2005 by the Raleigh Central Office, containing the following permitted equipment.
 - 1. Six (6) Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine generator sets. A Swift-Pac unit consists of two turbines, each equipped with water injection and an oxidation catalyst system, and one generator.

Each turbine has a nominal HHV rating of 300 million Btu per hour heat input capacity when firing natural gas, and a nominal HHV rating of 281 million Btu per hour heat input capacity when firing No. 2 fuel oil (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B),

2. One (1) diesel fire water pump (150 horsepower, ID No. ES7),
3. One (1) diesel emergency generator (700 kW, 778 horsepower, ID No. ES-8), and
4. Two 500,000 gallon No. 2 fuel oil storage tanks (ID nos. ES-9 and ES-10). [insignificant activity]

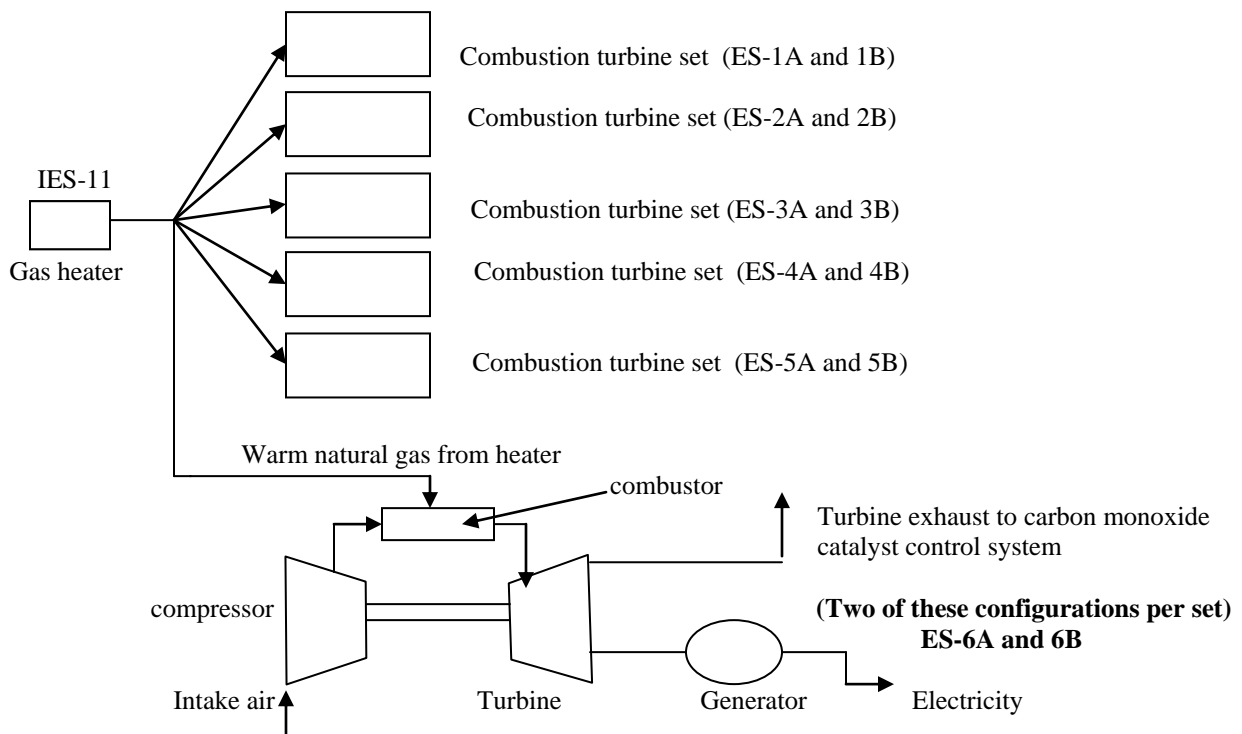
B. Permit No. 0949R01 was issued on January 20, 2006 by the Raleigh Central Office. The permit was issued to comply with the acid rain requirements in accordance with 15A NCAC 2Q .0400 and 40 CFR Part 72. No new equipment was added.

C. Permit No. 0949R02 was issued on June 15, 2006 by the Raleigh Central Office. The applicant modified the permit to reflect changes in the facility:

1. Updated performance and emissions data from Pratt & Whitney results in revised modeling.
2. Revised the facility layout that was incorporated into the revised modeling.
3. Requested the removal of the diesel firewater pump (ID No. ES-7) from the air permit.
4. Requested the removal of the diesel emergency generator (ID No. ES-8) from the air permit.
5. Requested a relaxed short-term number of operating hours for different levels of fuel oil sulfur content.
6. Requested the revision of the PSD avoidance condition limit on nitrogen dioxide and carbon monoxide emissions for the turbines as a result of removal of the fire-water pump and emergency generator.
7. Changed the responsible official from Mr. David Beam to Ms. Barbara Ziberna.
8. Changed the name of facility from Anson County Generation Facility to Anson Plant.
9. Revised the permit to incorporate the new NSPS Subpart KKKK (effective date = July 6, 2006) that replaced NSPS Subpart GG for turbines built after February 18, 2005 with peak heat input loads greater than 10 million Btu per hour. These changes were requested as an amendment to the original application received December 21, 2005.

D. Permit No. 0949R03 was issued on October 11, 2006 by the Raleigh Central Office. The applicant modified the permit to reflect the following changes in the facility design:

1. Construct a pipe line quality natural gas-fired heater at this electricity generation facility that will be used to warm up the natural gas fuel that will be fired in the six sets of simple cycle combustion turbines at this facility. The heater is anticipated to operate a maximum of 1,700 hours annually, but the NCEMC is requesting that the heater be permitted for 8760 hours per year. [Insignificant activity]



2. Change the wording of the visibility requirements (15A NCAC 2D .0521) to indicate that these are not applicable during startup, shutdown, or malfunctions approved in accordance with 15A NCAC 2D .0535.
3. Remove the annual performance test from the permit in accordance with 40 CFR Part 60, Subpart KKKK because the turbine utilizes water injection. In the preamble in the Federal Register/Vol. 71, No. 129/Thursday, July 6, 2006/Rules and Regulations, page 38483, Section II “Summary of the Final Rule”, Subsection F “How do I demonstrate compliance”, there is an exemption from requiring turbine using water injection to control NOx from having to perform annual stack tests. This section reads as follows:

In order to demonstrate compliance with the NOx limit, an initial performance test is required. If you are using water or steam injection, you must continuously monitor your water or steam to fuel ratio in order to demonstrate compliance and you are not required to perform annual stack testing to demonstrate compliance.

This was not completely spelled out in the actual rule in 40 CFR §60.4340 but is inferred in the first paragraph of that section. The annual performance test will be removed from the permit for the turbines using water injection to control NOx emissions.

4. NCEMC requested that language be included in the permit that states that both NOx and carbon monoxide emissions should also be held below 245 tons per consecutive 12-month period.
 5. Change the wording in Permit Condition A.4.b to reference A4 and A4(b) instead of A5 and A5(c).
 6. Change the monitoring requirements for carbon monoxide from the oxidation catalyst.
 7. Revise language, one of the A.5.c. Permit conditions should be changed to A.5.d.
 8. Change the wording in Permit Condition A.6.b to reference A5 instead of A6.
 9. Remove the firewater pump from Permit Condition A. 9. because this equipment was removed from the permit.
- E. Permit No. Permit No. 0949R04 was issued on March 5, 2007 to modify the current monitoring and testing permit conditions for the oxidation catalyst as follows:
1. Removal of the control efficiency testing requirement,
 2. Use new vendor data for the oxidation catalyst,
 3. Revise the monitoring temperature range and clarification of monitoring port, and
 4. Revise the definition of startup and shutdown of the turbines.
 5. Revise the monitoring and requirements to demonstrate compliance with 15A NCAC 2D .1418.

III. Purpose of the applications in this modification request

- A. Application 0400050.09B: to apply for renewal of the “300 permit”.
- B. Application 0400050.08A: to apply for a “first time” Title V permit.

IV. Facility Description:

This facility is a simple-cycle, natural gas-fired (low sulfur No. 2 fuel oil backup) combustion turbine electricity generating facility in Anson County. This facility uses six Pratt and Whitney FT8 Swift-Pac simple cycle gas turbine generator sets. Each of the six units consists of two turbines, each equipped with water injection and an oxidation catalyst system, and one generator. The two turbines associated with each FT-8 do not have to operate simultaneously. The double-ended configuration allows for greater efficiency during partial load usage. This plant operates as a “peaking” facility to meet peak power demands on a daily or seasonal basis and began operation in January 2007.

V. Statement of Compliance:

The DAQ has reviewed the compliance status of this facility. The latest inspection of the facility was by Mr. Tien Nguyen of the Fayetteville Regional Office. The inspection was performed on February 19, 2009. The report states that the facility appeared to be in compliance with all applicable requirements.

VI. Changes to the existing “300” Permit per applications 0400050.08A:

Old Page No.	New Page No.	Condition No.	Changes
Page 1	Page 1	Cover letter	Changed: Issue date of permit, 1 st sentence to describe the type of permit, revision date of permit,
Page 2	Page 2	Cover letter	Changed: Date in the heading, issue date of the permit, added EPA to copy list, Added Attachment A and B descriptions to bottom of page
Page 3	Page 3	Cover letter	Added insignificant activities list as an attachment, and revised the “changes to the permit “ table to reflect this permit modification
Body of the Permit			
Page 1	Page 1	Cover page of permit	Changed: Issue date, effective date, replaces permit No., Expiration date, permitted source layout, reformatted page
Pages 1-9	Pages 4-16	Specific Limitations and Conditions	Reformatted entire permit, added regulatory requirements for a Title V permit
Pages 9-11	Page 17-26	General Conditions	Added Title V General Conditions to permit

VII. Summary Of Emission Sources For Which This 1st Time Title V Permit Is Being Issued

Emission Source ID	Emission Source Description	Control Device ID No.	Control Device Description
ES-1A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1	Water injection system
		CD-1A	Oxidation catalyst system
ES-1B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1	Water injection system
		CD-1B	Oxidation catalyst system
ES-2A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1	Water injection system
		CD-2A	Oxidation catalyst system
ES-2B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1	Water injection
		CD-2B	Oxidation catalyst system
ES-3A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1	Water injection system
		CD-3A	Oxidation catalyst system

--Table continued on the next page--

VII. Summary Of Emission Sources For Which This 1st Time Title V Permit Is Being Issued (Continued)

Emission Source ID	Emission Source Description	Control Device ID No.	Control Device Description
ES-3B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-3B	Water injection system Oxidation catalyst system
ES-4A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-4A	Water injection system Oxidation catalyst system
ES-4B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-4B	Water injection system Oxidation catalyst system
ES-5A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-5A	Water injection system Oxidation catalyst system
ES-5B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-5B	Water injection system Oxidation catalyst system
ES-6A NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-6A	Water injection system Oxidation catalyst system
ES-6B NSPS	One Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity when firing natural gas, and 281 million Btu per hour nominal heat input capacity when firing No. 2 fuel oil) and one generator per set of turbines	CD-1 CD-6B	Water injection system Oxidation catalyst system

VIII. Source by Source evaluation:

A. Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine (300 million Btu per hour nominal heat input capacity each when firing natural gas, and 281 million Btu per hour nominal heat input capacity each when firing No. 2 fuel oil) and one generator

- ES-1A and 1B
- ES-2A and 2B
- ES-3A and 3B
- ES-4A and 4B
- ES-5A and 5B
- ES-6A and 6B

1. **Description:** These sources are simple-cycle, natural gas-fired, low sulfur No. 2 fuel oil-fired combustion turbine electricity generating units. Each unit is a Pratt and Whitney FT8 Swift-Pac simple cycle gas turbine generator set consisting of two turbines, each equipped with water injection and an oxidation catalyst system, and one generator. The two turbines associated with each FT-8 do not have to operate simultaneously. The double-ended configuration allows for greater efficiency during partial load usage. This plant operates as a “peaking” facility to meet peak power demands on a daily or seasonal basis.

2. **Applicable Regulatory Requirements:**
 These units are not subject to MACT, Subpart YYYY, because the emission of hazardous air pollutants from the facility is less than the major source thresholds. This MACT does not apply to area sources of HAPs. These units are subject to NSPS, Subpart KKKK “Standards of Performance For Stationary Combustion Turbines”.

The following provides a summary of limits and/or standards for the emission source(s) described above.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Visible emissions	20 percent opacity	15A NCAC 2D .0521
Sulfur dioxide	Any fuel: Not to exceed total sulfur content of 0.05 wt % (500 ppmw) -or- Any fuel: Not to exceed total sulfur dioxide emissions of 0.06 lbs/mmBtu heat input -or- Exit gases: Not to discharge sulfur dioxide emissions in excess of 0.90 pounds per megawatt-hour gross output	15A NCAC 2D .0524 NSPS, Subpart KKKK
	Allowances under tables 2, 3, or 4 or 40 CFR Part 73	15A NCAC 2Q .0400 Acid Rain
Toxic air pollutants	Operational limits	15A NCAC 2D .1100
Nitrogen oxides	No. 2 fuel oil: 74 ppm at 15 percent O ₂ (4-hour rolling average)	15A NCAC 2D .0524 NSPS, Subpart KKKK
	Natural gas: 25 ppm at 15 percent O ₂ (4-hour rolling average)	
	0.15 lbs per million Btu heat input (natural gas) 0.18 lbs per million Btu heat input (No. 2 fuel oil)	15A NCAC 2D .1418 New Electric Generating Units
	Less than 245 tons per consecutive 12 months	15A NCAC 2Q .0317 of (2D .0530) PSD Avoidance
Carbon monoxide	Less than 245 tons per consecutive 12 months	15A NCAC 2Q .0317 of (2D .0530) PSD Avoidance

a. 15A NCAC 2D .0501(e) "Emission Control Standards"

The emissions from the turbine stacks were modeled to estimate the maximum concentrations for all criteria pollutants. Some pollutant impacts were in excess of the significant impact levels [SILs] and a cumulative impact analysis was performed to show that impacts were below the state and national ambient air quality standards (AAQS).

The Permittee shall, on a daily basis, measure and record the operational turbine hours while burning No. 2 fuel oil plus the number of startup and shutdown hours.

b. 15A NCAC 2D .0521 "Control Of Visible Emissions"

As required by 15A NCAC 2D .0521 "Control of Visible Emissions," visible emissions from the combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B) manufactured after July 1, 1971, shall not be more than 20 percent opacity each when averaged over a six-minute period. However, six-minute periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity.

Natural gas and No. 2 fuel oil are clean burning fuels, and as such, the opacity should always be in compliance with the 20 percent limitation.

c. 15A NCAC 2D .0524 "New Source Performance Standards" [NSPS, Subpart KKKK]

This standard is applicable to stationary gas turbine units that have a heat input of greater than 10 mmBtu per hour, based on the lower heating value [LHV] of the fuel burned, that are manufactured after February 18, 2005. The combustion turbines at this facility are each greater than this threshold limit. NSPS, Subpart KKKK "Standards of Performance For Stationary Combustion Turbines" replaced existing NSPS Subpart GG on July 6, 2006 for turbines that are built after February 18, 2005 and that have a peak heat input load greater than 10 million Btu per hour.

For the combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B), the Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards" (NSPS) as promulgated in 40 CFR 60, Subpart KKKK, including Subpart A "General Provisions."

i. NSPS Emissions Limitations - As required by 40 CFR 60.4320 and 60.4330, the following permit limits shall not be exceeded:

Affected Facility	Pollutant		Emission Limit
Combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B)	Sulfur dioxide		0.060 lb/mmBtu
	Nitrogen oxides	No. 2 fuel oil	74 ppm at 15 percent O ₂ (4-hour rolling average)
		Natural gas	25 ppm at 15 percent O ₂ (4-hour rolling average)

ii. NSPS Performance Testing for NO_x – The combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B), shall be tested as follows:

The initial performance test has been completed at this facility. If emissions testing is required, the testing shall be performed utilizing EPA Reference Methods contained in 40 CFR Part 60 Appendix A or in accordance with a testing protocol approved by the DAQ. Details of the emissions testing and reporting requirements can be found in Section 3 - General Condition JJ. If the results of this test are above the limit given in Section 2.1 A. 2. b., c., and d. above, the Permittee shall be deemed in noncompliance with 40 CFR Part 60, Subpart.

- iii. NSPS Performance Testing for SO₂ – The combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B), shall be tested as follows:
- (A) No SO₂ performance test will be required because the Permittee has elected to monitor the total sulfur content of the fuel combusted in the turbine, by demonstrating that the fuel sulfur emissions do not exceed 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for units located in continental areas. [40 CFR §60.4365]
- iv. NSPS Monitoring/Recordkeeping
- (A) The Permittee shall monitor the total sulfur content of the fuel being fired in the turbine, except as provided in §60.4365. The sulfur content of the fuel shall be determined using total sulfur methods described in §60.4415. Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than half the applicable limit, ASTM D4084, D4810, D5504, or D6228, or Gas Processors Association Standard 2377 (all of which are incorporated by reference, see §60.17), which measure the major sulfur compounds, may be used.
- (B) In accordance with §60.4365, the Permittee may elect not to monitor the total sulfur content of the fuel combusted in the turbine, if the fuel is demonstrated not to exceed potential sulfur emissions of 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for units located in continental areas. The Permittee shall use one of the following sources of information to make the required demonstration:
- (1) The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for oil use in continental areas is 0.05 weight percent (500 ppmw) or less. The total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet and has potential sulfur emissions of less than less than 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for continental areas.
- (2) Representative fuel sampling data which show that the sulfur content of the fuel does not exceed 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for continental areas. At a minimum, the amount of fuel sampling data specified in section 2.3.1.4 or 2.3.2.4 of Appendix D to Part 75 of this chapter is required.
- (C) The frequency of determining the sulfur content of the fuel shall be follows:
- (1) For *fuel oil*, use one of the total sulfur sampling options and the associated sampling frequency described in sections 2.2.3, 2.2.4.1, 2.2.4.2, and 2.2.4.3 of appendix D to Part 75 of this chapter (*i.e.* , flow proportional sampling, daily sampling, sampling from the unit's storage tank after each addition of fuel to the tank, or sampling each delivery prior to combining it with fuel oil already in the intended storage tank).
- (2) *Gaseous fuel*. If the Permittee elects not to demonstrate sulfur content using options in §60.4365, and the fuel is supplied without intermediate bulk storage, the sulfur content value of the gaseous fuel shall be determined and recorded once per unit operating day.
- (3) *Custom schedules*. Notwithstanding the requirements of §60.4370(b), operators or fuel vendors may develop custom schedules for determination of the total sulfur content of gaseous fuels, based on the design and operation of the affected facility and the characteristics of the fuel supply. Except as provided in paragraphs §60.4370(c)(1) and (c)(2), custom schedules shall be substantiated with data and shall be approved by the Division of Air Quality before they can be used to comply with the standard in §60.4330.

Reporting [15A NCAC 02Q .0508(f)]

- iv. The Permittee shall submit a summary report of the monitoring and recordkeeping results postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this permit must be clearly identified.

d. 15A NCAC 2Q .0317 “Avoidance Conditions” [avoidance of 15A NCAC 2D .0530] - CO

i. To comply with this permit and to avoid applicability of 15A NCAC 2D .0530 "Prevention of Significant Deterioration," as requested by the Permittee, **carbon monoxide** emissions from the combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B) shall be **less than 245 tons** per consecutive 12-month period.

ii. Performance Testing

The initial performance testing has been completed. If additional performance testing is required, the testing shall be performed in accordance with General Condition JJ of the Title V permit. If the results of this test are above the limit given in Section VIII. A. 2. d. i. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

iii. Monitoring/Recordkeeping

(A) Turbine startup and shutdown shall be limited to an average of 2 hours per day per turbine.

On a turbine-by-turbine basis, startup and shutdown is defined as operation from 0 to 50 percent electrical output during natural gas firing and/or fuel oil firing. The Permittee shall record the number of startup and shutdown hours for each turbine on a daily basis.

(B) Carbon monoxide emissions shall be controlled by an oxidation catalyst. The oxidation catalyst shall be monitored by periodic sampling (coupon sampling) as recommended by the manufacturer and by gas temperature at the gas generator exhaust. The gas temperature at the exhaust exit of the gas generator shall be monitored and maintained between **840 to 1800** degrees Fahrenheit except during start-up and shutdowns. Measured temperature at the gas generator shall be correlated to measured temperature at the catalyst outlet during testing performed under NSPS Subpart KKKK testing. Any values falling outside the above operating parameters shall be recorded and dated, along with actions taken to bring them back within normal operating ranges.

(C) In order to ensure compliance with the above avoidance limit for carbon monoxide (CO), the Permittee shall maintain a gas generator exhaust temperature (3-hour block average) within the range of 840 to 1800 degrees Fahrenheit for each oxidation catalyst (ID Nos. CD-1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, and 6B).

(1) Each calendar month, the Permittee shall calculate the CO emissions of each turbine or the previous month and the previous 12-month period to ensure compliance with Condition 5. a. above.

(a) Monthly CO emissions, in tons, shall be calculated as follows:

$$E_{CO} = \{[(A_g \times t_{catalyst}) + (B_g \times t_{nocon})] + [C_{g-startup} \times N] + [D_{g-shutdown} \times N] + [(E_{fo} \times t_{catalyst}) + (F_{fo} \times t_{nocon})] + [G_{fo-startup} \times N] + [H_{fo-shutdown} \times N]\} \times 1/2000$$

Where:

E_{CO} = number of tons of CO emissions per month

A_g = pounds of CO per hour after control when firing natural gas

B_g = pounds of CO per hour assuming no carbon monoxide control when firing natural gas

C_g = pounds of CO per startup event when firing natural gas

D_g = pounds of CO per shutdown event when firing natural gas

E_{fo} = pounds of CO per hour after control when firing No. 2 fuel oil

F_{fo} = pounds of CO per hour assuming no carbon monoxide control when firing fuel oil

G_{fo} = pounds of CO per startup event when firing No. 2 fuel oil

H_{fo} = pounds of CO per shutdown event when firing No. 2 fuel oil

$t_{catalyst}$ = hours per month when the gas generator exhaust temperature is **inside** the specified range

t_{nocon} = hours per month when gas generator exhaust temperature is **outside** the specified range

N = number of times started up or shutdown in the month

Until DAQ approval of performance test results and the administrative amendment of this permit to incorporate those results, the following values shall be used:

$A_g = 7.8$ lbs
 $B_g = 78.4$ lbs
 $C_g = 25.93$ lbs
 $D_g = 24.07$ lbs
 $E_{fo} = 2.0$ lbs
 $F_{fo} = 19.6$ lbs
 $G_{fo} = 5.34$ lbs
 $H_{fo} = 5.94$ lbs

- (D) Consecutive 12-month rolling CO emissions, in tons, shall be calculated by summing the monthly emissions, as determined above, for the previous 12-month period for the turbine units.

If the Permittee fails to complete the required monthly calculations, or if the CO emissions as calculated above exceed the limit of 245 tons per year, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

Reporting Requirements [15A NCAC 2Q .0508(f)]

- iv. The Permittee shall submit a semi-annual summary report, acceptable to the Regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December, and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
- (A) The monthly CO emissions for the previous 17 months. The emissions must be calculated for each of the 12-month periods over the previous 17 months;
 - (B) The monthly quantities of natural gas and No. 2 fuel oil consumed for the previous 17 months;
 - (C) Any exceedance including the date and any 3-hour block time period, that the average catalyst temperature is not maintained.
- e. **15A NCAC 2Q .0317 “Avoidance Conditions” [avoidance of 15A NCAC 2D .0530] -NO_x**
- i. To comply with this permit and to avoid applicability of 15A NCAC 2D .0530 "Prevention of Significant Deterioration," as requested by the Permittee, **nitrogen dioxide** emissions from the combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B) shall be **less than 245 tons** per consecutive 12-month period.
 - ii. The Permittee shall monitor NO_x emissions from combustion turbines (ID Nos. ES-1A, ES-1B, ES-2A, ES-2B, ES-3A, ES-3B, ES-4A, ES-4B, ES-5A, ES-5B, ES-6A, ES-6B) as per Appendix E to Part 75. The Permittee shall perform initial, periodic, and other quality assurance/quality control NO_x emission testing as per this Appendix. The Permittee shall conform to all details of the emissions testing and reporting requirements in Section 3 - General Condition JJ of the Permit.

If the results of any tests for NO_x are above the limits given above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0530.

Reporting Requirements [15A NCAC 2Q .0508(f)]

- iii. The Permittee shall submit a semi-annual summary report, acceptable to the Regional Air Quality Supervisor, of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December, and July 30 of each calendar year for the preceding six-month period between January and June. The report shall contain the following:
 - (A) The monthly NOx emissions for the previous 17 months. The emissions must be calculated for each of the 12-month periods over the previous 17 months;
 - (B) The monthly quantities of natural gas and No. 2 fuel oil consumed for the previous 17 months;
 - (C) Any exceedance including the date and any 3-hour block time period, that the average catalyst temperature is not maintained.

f. 15A NCAC 2D .1418 “New Electric Generating Units”

This rule is applicable to any fossil fuel fired combustion turbine permitted after October 31, 2000, serving a generator with a nameplate capacity of 25 megawatts electrical, and selling any amount of electricity. The generators proposed in this application have a capacity of 56.7 megawatts.

- i. Pursuant to 15A NCAC 2D .1418, emissions of nitrogen oxides from any fossil fuel-fired combustion turbines permitted after October 31, 2000, serving a generator with a nameplate capacity greater than 25 megawatts electrical and selling any amount of electricity shall not exceed **0.15 pounds per million Btu** for gaseous and solid fuels and **0.18 pounds per million Btu** for liquid fuels if it is not covered under Rule 15A NCAC 2D .0530 (prevention of significant deterioration) or 15A NCAC 2D .0531 (nonattainment area major new source review).

Monitoring - Under 40 CFR 75.12(e), gas-fired or oil-fired peaking units may use procedures specified in Appendix E of the part for estimating hourly NOx emission rates in lieu of CEMs.

g. 15A NCAC 2D .1100 “Control of Toxics Air Pollutants”

Since the combustion turbines burn unadulterated fossil fuels, these sources are exempt under 2Q .0702(18) from triggering a toxics review. However, the applicant did model sulfuric acid mist that results from the use of the oxidation catalyst. The modeling results showed that the 1-hour maximum concentrations were approximately 67 percent of the acceptable ambient level [AAL] and that the 24-hour maximum concentrations were approximately 96 percent of the AAL.

As required by 15A NCAC 2D .1100 “Control of Toxic Air Pollutants,” operation of the combustion turbines shall be limited while burning No. 2 fuel oil as follows:

Fuel Oil Sulfur Content	Maximum Turbine-Hours/Day (total 12 turbines)
0.050 % or less	132
0.045 or less	144
0.040 or less	168
0.030 or less	204
0.025 or less	unlimited

Monitoring/Recordkeeping

- i. The Permittee shall on a daily basis measure and record the operational turbine hours while burning No. 2 fuel oil and the fuel oil sulfur content (percent) corresponding to these turbine hours.

Reporting Requirements

- ii. The Permittee shall submit a summary report of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. All instances of deviations from the requirements of this condition must be clearly identified.

h. 15A NCAC 2D .1111 “Maximum Achievable Control Technology”

Using AP-42 emission factors for the burning of both natural gas and distillate fuel oil for the combustion turbines and distillate fuel oil for the emergency generator and water pump, the maximum hazardous air pollutant [HAP] emissions equated to 2.92 tons per year for all HAPs and 1.9 tons per year for a single HAP. This defines the site as a minor source for HAPs and therefore not subject to MACT Part 63, Subpart YYYYY [Stationary Combustion Turbines].

i. 15A NCAC 2D .0614 “Compliance Assurance Monitoring”

CAM does not apply for criteria pollutants SO₂, and NO_x in accordance with 2D .0614(b)(1)(A). This regulation exempts sources that are regulated by emission limitations or standards that are proposed by the Administrator of the Environmental Protection Agency after November 15, 1990 pursuant to section 111 or 112 of the Federal Clean Air Act. NSPS, Subpart KKKK was revised on July 6, 2006 and regulates SO₂ and NO_x emissions from combustion turbines.

This regulation also exempts sources that have an emissions cap that is approved under the rules of Subchapters 2D and 2Q of the North Carolina regulations that is incorporated in a Title V permit. This facility has a PSD Avoidance condition for both NO_x and CO. Therefore, a CAM plan is not required for SO₂, NO_x, or CO.

j. 15A NCAC 2Q .0400 "Acid Rain Procedures" (40 CFR Part 72 “Permits Regulation”)

North Carolina air quality regulation 15A NCAC 2Q .0400 implements Phase II of the federal acid rain program pursuant to Title IV of the CAA as provided in 40 CFR Part 72. Issuance or denial of acid rain permits shall follow the procedures under 40 CFR Part 70 (Title V) and Part 72. If the provisions or requirements of Part 72 conflict or are not included in Part 70, the Part 72 provisions and requirements shall apply and take precedence.

15A NCAC 2Q .0400 “Acid Rain Procedures” (40 CFR Part 75 “Continuous Emissions Monitoring”)

This regulation establishes requirements for the installation, certification, operation, and maintenance of continuous emissions or opacity monitoring systems.

The following sources are affected units under 40 CFR Part 72.6 and are therefore subject to the Phase II acid rain requirements:

Emission Source ID No.	Emission Source Description
ES-1A ES-1B ES-2A ES-2B ES-3A ES-3B ES-4A ES-4B ES-5A ES-5B ES-6A ES-6B	Six (6) Pratt & Whitney FT8 Swift-Pac simple-cycle gas turbine generator sets. A Swift-Pac unit consists of two turbines, each equipped with water injection and an oxidation catalyst system, and one generator. Each turbine has a nominal HHV rating of 300 million Btu per hour heat input capacity when firing natural gas, and a nominal HHV rating of 281 million Btu per hour heat input capacity when firing No. 2 fuel oil

k. Carbon Monoxide Monitoring for the Catalyst

The current permit indicates that the carbon monoxide emissions from the combustion turbine sets shall be controlled by one oxidation catalyst system per set (six total).

The applicant states that monitoring pressure drop across the catalyst will not yield valuable data regarding catalyst fouling or remaining catalyst life. Catalyst poisoning would not exhibit a significant change in pressure drop across the catalyst. Plugging of the catalyst is typically only an issue for facilities utilizing solid fuel where particulate loading is significant. Additionally, the exhaust gas stream would not be of a composition that would indicate a risk of poisoning. As a practical alternative to measuring pressure drop across the catalyst, NCEMC proposes to sample the catalyst material by removing coupons (buttons) provided by the catalyst manufacturer (for the purpose of sampling) to determine remaining catalyst life. Sampling of the catalyst material periodically is a procedure recommended by the manufacturer to monitor catalyst health and is a practice performed by similar combustion turbine facilities to demonstrate compliance.

Vendor information ENSR has provided during previous application submittals on behalf of NCEMC, has indicated that the oxidation reaction between oxygen and carbon monoxide, which is enhanced by the catalyst, occurs at 500 degrees Fahrenheit and above to form carbon dioxide. Engelhard's specified maximum temperature of 1100 degrees Fahrenheit is a mechanical limit above which deterioration in performance could be expected. NCEMC proposes to monitor gas temperature at the exhaust exit of the gas turbine generator. Pratt & Whitney, the turbine manufacturer, has calculated the temperature range at the gas turbine exit that corresponds to the 500 - 1100 degree Fahrenheit temperature range at the catalyst bed to be 900 – 1500 degrees Fahrenheit at the exit of the gas turbine.

Note:

NCEMC requests that the gas temperature be monitored at the gas expansion turbine exhaust, prior to the power turbine. It is important to note that the gas temperature will cool as it travels from the power turbine exit to the inlet of the catalyst bed. Because of this expected cooling, Pratt & Whitney created a correlation curve plotting the catalyst inlet temperature versus the gas turbine exhaust temperature. The gas turbine exhaust temperature that **correlates** to the catalyst vendor's recommended catalyst bed temperature (600 °F - 1150 °F) operating range is 840 °F to 1800 °F. **The operating temperature range is (840 °F -1800 °F).**

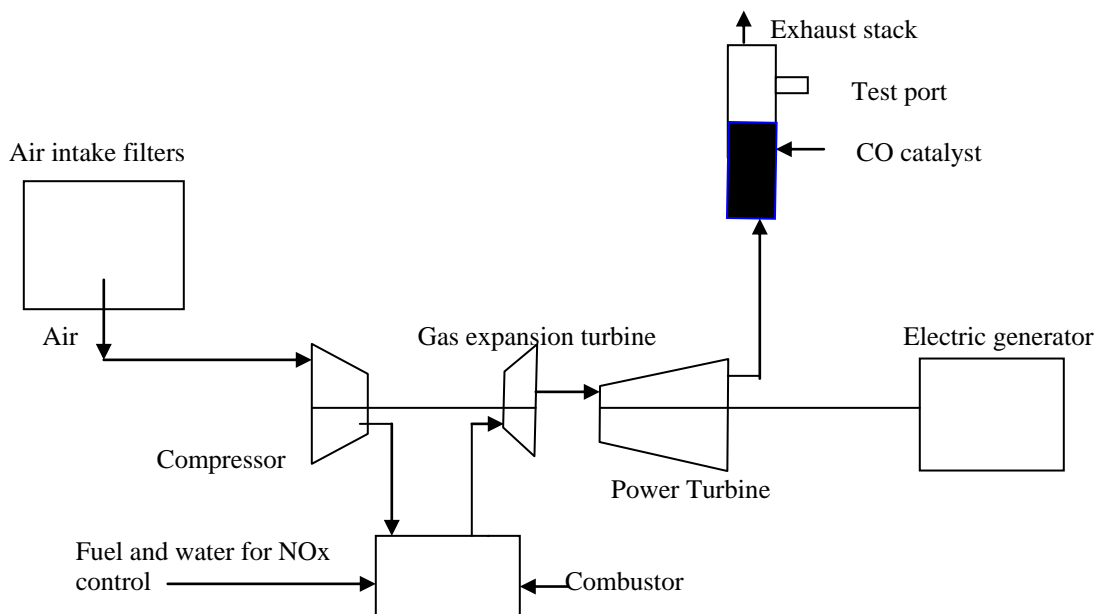


Diagram of One combustion Turbine (2 for each generator) Pratt & Whitney FT8 SwiftPac

i. **NAAQS Modeling:**

NAAQS modeling was submitted with application 0400050.06B (revision R03). Ms. Jamie Sellman, of the Division of Air Quality Analysis Branch reviewed the dispersion modeling submitted by this facility. The modeling analysis was performed for PM₁₀, TSP, SO₂, CO, and NO_x emitted from the NCEMC facility. The modeling analysis adequately demonstrates compliance with the National Ambient Air Quality Standards (NAAQS) on a source- by-source basis.

The AERMOD model was run for the natural gas heater (ID No. IES-11), 12 combustion turbines for natural gas and fuel oil operations, and offsite sources. The facility modeled four operating load scenarios, with the turbines operating at 100%, 75%, 50%, and “low load”. Direction-specific building dimensions, determined using EPA’s BPIP-PRIME program, were input to the AERMOD Model for building wake effect determination. Five years of meteorological data (1987-1991) from Charlotte (surface) and Greensboro (upper air) were processed by AERMET and used in the analysis. Sufficient receptors were placed around the property, and were spaced 50 meters apart along the property boundary. The AERMAP preprocessor assigned terrain heights and hill height scales to each receptor based on US Geological Survey digital elevation model (DEM) data.

Annual PM₁₀, annual SO₂, and 1-hour and 8-hour CO were below the corresponding SILs and required no further modeling. A full NAAQS analysis was required for annual NO_x, 24-hour PM₁₀, 3-hour and 24 hour SO₂, and TSP and found the results to be 32%, 38%, 11%, and 12%, and 66% respectively after adding background concentrations.

The air dispersion modeling analysis was conducted with emission rates and flue gas exhaust characteristics (flow rate and temperature) that are expected to represent the worst-case parameters among the range of possible values for the Pratt & Whitney Swift-Pac™ chosen for the Anson Plant. Since turbine emission rates and flue gas characteristics for a given turbine load vary as a function of ambient temperature, data was derived for a range of ambient temperatures and load scenarios.

In order to conservatively calculate ground-level concentrations, a composite “worse-case” set of emission parameters was used in the modeling. For each simple-cycle operating load, the highest pollutant-specific emission rate coupled with the lowest exhaust temperature and lowest exhaust flow rate was selected.

Table 1 Worst–Case Combustion Turbine Stack Data for Dispersion Modeling – Natural Gas Heater (NCEMC’s Plant)

Parameter	Value
Stack Height	17.5 feet
Stack Diameter	1.42 feet
Exit Temperature	900 degrees Fahrenheit
Exit Velocity	19.78 feet/second
NO _x	0.22 pounds/hour
CO	0.22 pounds per hour
SO ₂	0.0012 pounds per hour
TSP/PM ₁₀	0.016 pounds per hour

Table 2 Worst –Case Combustion Turbine Stack Data for Dispersion Modeling – Natural gas firing (NCEMC’s Plant)

Parameter	Value			
	100	75	50	40
Stack Height	60.0 feet	60.0 feet	60.0 feet	60.0 feet
Stack Diameter	8.21 feet	8.21 feet	8.21 feet	8.21 feet
Exit Temperature	706.0 °F	629.0 °F	572.0 °F	603.0 °F
Exit Velocity	145.2 feet/sec	125.5 feet/sec	105.9 feet/sec	99.7 feet/sec
NO _x	31.4 lbs/hr	24.3 lbs/hr	18.0 lbs/hr	15.7 lbs/hr
CO	6.1 lbs/hr	8.0 lbs/hr	7.8 lbs/hr	5.8 lbs/hr
SO ₂	1.74 lbs/hr	1.35 lbs/hr	0.99 lbs/hr	0.87 lbs/hr
TSP/PM ₁₀	5.88 lbs/hr	5.88 lbs/hr	5.88 lbs/hr	5.88 lbs/hr

Table 3 Worst-Case Combustion Turbine Stack Data for Dispersion Modeling – Fuel oil firing (NCEMC’s Plant)

Parameter	Value			
	100	75	50	40
Load %	100	75	50	40
Stack Height	60.0 feet	60.0 feet	60.0 feet	60.0 feet
Stack Diameter	8.21 feet	8.21 feet	8.21 feet	8.21 feet
Exit Temperature	673.0 °F	620.0 °F	565.0 °F	599.0 °F
Exit Velocity	142.0 feet/sec	123.2 feet/sec	103.4 feet/sec	83.1 feet/sec
NO _x	51.0 lbs/hr	39.6 lbs/hr	29.2 lbs/hr	18.7 lbs/hr
CO	1.5 lbs/hr	1.6 lbs/hr	1.9 lbs/hr	1.3 lbs/hr
SO ₂	14.6 lbs/hr	11.4 lbs/hr	8.4 lbs/hr	5.4 lbs/hr
TSP/PM ₁₀	18.0 lbs/hr	18.0 lbs/hr	18.0 lbs/hr	18.0 lbs/hr

The modeling analysis adequately demonstrates compliance with the National Ambient Air Quality Standards (NAAQS) on a source- by-source basis.

Turbine startup and shutdown shall be limited to an average of 2 hours per day per turbine. On a turbine-by-turbine basis, startup and shutdown is defined as operation from 0 to 50 percent electrical output during natural gas firing and/or fuel oil firing.

Monitoring - The Permittee shall on a daily basis measure and record the operational turbine hours while burning No. 2 fuel oil and the fuel oil sulfur content (percent) corresponding to these turbine hours. Also, the Permittee shall record the number of startup and shutdown hours for each turbine on a daily basis. Monitoring total sulfur content of fuel combusted in the turbines shall be conducted per 40 CFR 60 Subpart KKKK.

Reporting - The Permittee shall submit an exception report of monitoring and recordkeeping activities postmarked on or before January 30 of each calendar year for the preceding six-month period between July and December and July 30 of each calendar year for the preceding six-month period between January and June. The exception report shall contain any deviations by date from the above listed operating limitations.

- IX.** A Professional Engineers Seal **is not** required for this permit application.
- X.** A consistency determination **is not required** for this modification. A request for a consistency was provided when the sources were previously permitted under the State 300 permitting process.
- XI.** An application fee of \$867.00 is required and was received by the DAQ Central Office on January 11, 2008.
- XII.** The appropriate numbers of copies of the application were received by the DAQ on January 11, 2008.
- XIII.** The application was signed by an authorized official as defined by 15A NCAC 2Q .0304(j).
- XIV.** This facility is not subject to 15A NCAC 2Q .0508(g) “Prevention of Accidental Releases” because it does not store chemicals that are subject to this regulation in quantities great enough to cross the threshold limits.
- XV.** **Air toxics:** An air toxics review is not triggered with this modification.
- XVI.** **Public Notice**
A thirty-day public notice **is required** for this one-step Significant Modification procedure.

Public notice: The 30 day public notice period was from ___ through _____, 2009. ___public comments were received for this permit application.

EPA 45-Day review Period: The DAQ sent copies of the appropriate information to the USEPA prior to the public notice. The EPA 45-day review period was from ___2009 through ___, 2009. The USEPA ___ have any comments on this modification.

XVII. NonAttainment:

Anson County **has not been** designated nonattainment for the eight-hour ozone standard.

XVIII. Prevention of Significant Deterioration (PSD)

This facility is not major for PSD, and the proposed modification in this application does not trigger a PSD review. Also, the PSD minor source baseline date has not been triggered for any criteria pollutant in Anson County.

XIX. MACT:

40 CFR Part 63, Subpart YYYY (combustion turbines) does not apply to the turbines at this facility because the facility is not major for hazardous air pollutants.

The maximum total HAP emissions are approximately 3 tons per year, and approximately 2.0 tons per year for any single HAP.

XX. This facility **is not** subject to 15A NCAC 2Q .0508(g) "Prevention of Accidental Releases" because this facility does not store any of the regulated substances in quantities above the thresholds.

XXI. Recommendations

This modification, issued as a 1st Time Title V" to the North Carolina Electric Membership Corporation, located in Lilesville, Anson County, North Carolina, has been reviewed by the DAQ to determine compliance with all procedures and requirements. The DAQ has determined that this facility is complying or will achieve compliance as specified in the permit with all applicable requirements.

A copy of the draft permit was submitted to the NCEMC on December 17, 2009. A response from the applicant was received on _____2010.

The Fayetteville Regional Office did not comment on the initial application, however, they did comment on the engineering review and draft permit. The Fayetteville Regional Office concurs with the issuance of this permit.

Issue permit No. 09492T05.