

Air Permit Review

Permit Issue Date: **XX XX, 2011**

Region: Mooresville Regional Office
County: Cabarrus
NC Facility ID: 1300155
Inspector's Name: Jim Westmoreland
Date of Last Inspection: 10/19/2010
Compliance Code: 3 / Compliance - inspection

| | | | |
|--|---|---|--|
| Facility Data | | | Permit Applicability (this application only) |
| <p>Applicant (Facility's Name): Piedmont Natural Gas - Concord Compressor</p> <p>Facility Address: Piedmont Natural Gas - Concord Compressor 2725 Derita Road Concord, NC 28207</p> <p>SIC: 4923 / Gas Transmission And Distribution NAICS: 48621 / Pipeline Transportation of Natural Gas</p> <p>Facility Classification: Before: Title V Major After: Title V Major Fee Classification: Before: Title V After: Title V</p> | | | <p>SIP: 2Q .0317 avoidance of the major source provisions of 40CFR Part 63 Subpart ZZZZ; 2D .1423 (Compliance Plan) NSPS: Subpart JJJJ NESHAP: Subpart ZZZZ PSD: PSD Avoidance: NOx VOC and CO NC Toxics: 112(r): Other: NAA Avoidance NOx and VOC</p> |
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| <p>Consultant: Tony Jabon tjabon@trinityconsultatns.com Review Engineer: Charles F. Yirka</p> <p>Review Engineer's Signature: _____ Date: XX XX, 2011</p> | | <p>Comments / Recommendations: Issue 09604/T04 Permit Issue Date: XX XX, 2011 Permit Expiration Date: XX XX, 2016</p> | |

1. Purpose of Application:

This is a natural gas compression station used to compress and supply excess natural gas during peak periods. This facility is operated remotely. This application is for the first-time title V permit. The last permit issued to Piedmont Natural Gas (PNG) authorized the construction and operation of:

Four identical natural gas-fired, four-stroke lean burn (4SLB) reciprocating internal combustion engines (RICE) with spark ignition each rated at 4,735 horsepower (hp), each driving natural gas compressors (ID Nos. COMP04, COMP05, COMP06 and COMP07). These engine's emissions will be controlled with catalytic oxidizers (ID Nos. COMP04C, COMP05C, COMP06C and COMP07C). The engine manufacturer is Caterpillar and the model number is G3616LE.

This facility is classified as a title V major source. There is an enforceable limitation that defines the PTE by limiting after control emissions of HAPs therefore the facility is a HAP minor source with a PTE of less than 10 (each) and 25 tpy (total) HAPs.

The facility is classified as a HAP minor source, however, the substantive area source provisions of the RICE MACT Subpart ZZZZ and the NSPS Subpart JJJJ required addressing in this title V permit.

2. Application Chronology:

- March 17, 2006 – Permit 09604R00 issued for three new 4SLB RICE driving compressors and one new emergency 4SLB RICE. Permit R00 required testing for NOx, CO, VOC and formaldehyde.
- June 12, 2006 – If constructed on or after this date stationary RICE located at an area source of HAP emissions are considered new units. All existing and new engines (except for the emergency unit) were erroneously considered subject to the major source provisions of the RICE MACT Subpart ZZZZ.
- March 6, 2007- First stack test was conducted for NOx, CO and VOC on engines COMP01 and COMP03.
- March 15, 2007 – NOV was issued for a late stack test report.
- April 4, 2007 – Permit 09604R01 was issued for a larger RICE emergency unit (ID No. EG01; 574 kW/770 hp).
- July 1, 2007 – Engines greater than or equal to 500 HP ordered after this date will be subject to NSPS Subpart JJJJ. The existing engines appeared to not be subject.
- July 27, 2007 – Memo from SSCB to MRO. The March 6 stack testing indicating formaldehyde testing not acceptable, negative VOC reduction for Unit 1 therefore not acceptable however CO control efficiency was acceptable. Also, Unit 3 VOC test results did not demonstrate compliance with 2Q .0315. Compliance with NOx limit of 0.229 lb/mmBtu was indicated.
- Oct. 22/23, 2007 – Additional NOx, VOC and formaldehyde emissions testing of the engines was performed.
- November 23, 2009 – Application was received
- December 22, 2009 – Received zoning consistency
- January 1, 2009 – Emergency units greater than 25 HP ordered after this date will be subject to NSPS Subpart JJJJ.
- March 24, 2009 – SSCB Memo indicating the VOC and formaldehyde emissions testing of the 3 existing engines performed on October 22 and 23, 2007 was found acceptable.
- March 31, 2009 – MRO letter to facility indicating VOC and formaldehyde emissions testing of the three existing engines as required by R01 as performed on October 22 and 23, 2007 was found acceptable.
- February 12, 2010 – Draft to supervisor for review
- March 3, 2010 – Draft review by supervisor completed. Sent draft permit and review for comment via email to applicant and region
- March 23, 2010 – Comments via email received from applicant
- March 31, 2010 – Second draft was sent via email to applicant
- April 7, 2010 – Final draft was sent via email to applicant
- April 12, 2010 – Comments were received via email
- April 14, 2010 – Issued permit R02
- April 28, 2010 – The applicant requested the permit be modified through the informal means pursuant to NCGS 150B-23. The DAQ concurred the entire facility including all of

the existing and new engines at PNG, though affected by the RICE MACT only the three new engines are required to comply with the limitation and standards of NSPS Subpart JJJJ.

- May 5, 2010 – The DAQ met with applicant to discuss proposed changes.
- May 7, 2010 – Application was created for administrative amendment
- May 27, 2010 – RACT compliance demonstration submitted for approval
- XX XX, 2010 – Email to SSCB requesting concurrence with RACT compliance demonstration. No response.
- June 1, 2010 – Draft permit to MRO
- June 21, 2010 – Title V Supervisor
- July 20, 2010 – Comments on draft permit and review received from applicant
- August, 2010 – Final revisions of Subpart ZZZZ concerning area sources
- August 27, 2010 – Supervisor comments received

- September 1, 2010 – Permit issued for construction and operation of 3 new spark ignition engines. Permit requires title V application for a 1st time permit to be filed within 12 months of beginning operation of a new unit
- October 19, 2010 – Compliance inspection by Mr. Westmoreland of the Mooresville Regional Office
- November 24, 2010 – Application received.
- January 20, 2011 – Meeting held at Raleigh Central Office to discuss the application. The applicant notified RCO the engines were presently not certified by manufacturer, therefore, testing a representative unit was proposed since units are identical. The DAQ advised PNG concerning the GHG Tailoring rules.
- February 4, 2011 – Application addendum via email received addressing the above meeting concerns and update application.
- February 8, 2011 – Email response from DAQ to applicant regarding letter.
- February 14, 2011 – Draft permit and review to supervisor and ESM review.
- March 15, 2011 – Permit and review submitted to region for review
- March 15, 2011 – Draft permit submitted to applicant
- March 28, 2011 – Applicant comments received

3. Changes to Permit
ATTACHMENT to Permit No. 09064T04

The following table provides a summary of changes made to the permit **09604R03**:

| Page | Section | Change |
|--|---------|---|
| Cover letter | N/A | -- Change Responsible Official. Permit and application number, dates revised, indicate permit is 1 st time title V. Remove statement regarding a title V application is required within 12 months of construction. |
| Attachment Insignificant Activities List | N/A | -- Update table with new footnotes according to SOP. No changes to source list. |
| Permit Cover | N/A | --Update permit and application number and dates. |
| 4 | 1. | -- Revise catalytic oxidizer from 6.7 to 24.0 cubic feet for the 3 existing engines -- Remove all footnotes including “must file application within 12 |

| Page | Section | Change |
|-------|----------|---|
| | | months of commencing operation” |
| 5 | 2.1 A. | -- Remove reference the NAAQS for NO2 |
| 5-13 | 2.1 A.1. | -- Expand Subpart ZZZZ applicability section. |
| 14 | 2.1B. | --Revise description; catalytic oxidizer from 6.7 to 24.0 cubic feet for the 3 existing engines for ZZZZ compliance. -- Remove reference the NAAQS for NO2 -- Table, Insert ZZZZ requirements --Table, refer to expanded RACT requirements in 2.2 A.5. |
| 14-27 | 2.1 B.1. | -- Expand Subpart ZZZZ applicability section. |
| 28 | 2.1 C. | -- Table, lower Subpart JJJJ emissions limits as per application addendum due to construction date -- Table, remove reference the NAAQS for NO2 --Table, refer to expanded RACT requirements in 2.2 A.5. |
| 28-37 | 2.1 C.2. | --Move Subpart ZZZZ applicability section to proceed JJJJ -- Expand Subpart JJJJ applicability section. |
| 37 | 2.2 A. | -- Revise description; catalytic oxidizer from 6.7 to 24.0 cubic feet for the 3 existing engines for ZZZZ compliance. -- Table, remove reference the NAAQS for NO2 --Table, refer to expanded RACT requirements in 2.2 A.5. |
| 41-42 | 2.1 A.6. | --Expand RACT rule 2D .1423. Remove CMS requirements based on compliance plan approved by Permits Section. |
| 43-54 | 3. | --Replace General Condition s with the latest version ver. 3.3 |

4. Background Information:

The original permit **09604R00**, issued on March 17, 2006, was for a greenfield facility. The facility included:

- three natural gas-fired, four-stroke lean burn (4SLB) reciprocating internal combustion Caterpillar Model No. G3616 engines (RICE) with spark ignition all rated at 4,735 horsepower (hp), each driving natural gas compressors (ID Nos. COMP01, COMP02, and COMP03). These engine’s emissions were controlled with catalytic oxidizers (ID Nos. COMP01C, COMP02C, and COMP03C); and
- one natural gas-fired, 4SLB RICE rated driving an emergency generator rated at 350kW (ID No. EG01) with no emissions controls.

This permit included synthetic minor conditions to avoid the MACT Subpart ZZZZ (10 tpy for the HAP formaldehyde and 25 tpy for total HAPs) and synthetic minor conditions to avoid NAA/ NSR for CO and VOC of 100 tpy. Synthetic minor conditions to avoid NAA/ NSR were not required for NOx. The facility was classified as a “true” minor for NOx based on no control

(oxidation catalysts are not effective for NO_x reduction). The emissions factors determined by the 03/06/07 stack test for NO_x emissions, required for two of the three large engines, appeared to support the determination that the facility was a true minor as would the Caterpillar specifications.

Permit **09604R01** was issued for a larger Cummins RICE emergency unit (ID No. EG01; 574 kW/770 hp) that was 350/kW. The original engine was exempt as per 2Q .0102(c)(2)(E)(i) with emissions of less than 5 tpy and PTE based on 500 hours per year. The larger engine was not exempt since emissions were greater than 5 tpy. Therefore, the engine was moved into the permit from the insignificant activities list. Even so, the facility was found by MRO to remain a minor source for NO_x.

Stack testing was first required by MRO's permit R01 for the original three 4,375 hp RICE. The first stack tests were inconclusive for formaldehyde and for VOC emissions. The CO reduction efficiency test was demonstrated to be **98.5%** while an efficiency of **94.98%** was required. Even so the underlying standard (PSD avoidance limit) was not violated. Compliance with the corresponding 100 tons per year PSD avoidance limits (based on emissions rate per unit of **0.22 to 0.25 lb/hr**, each) was indicated. (See memorandum from Ms. Paula Hemmer July 27, 2007). Since the tests for VOC and formaldehyde were inconclusive, the units required further testing. With additional testing compliance was indicated for the synthetic minor conditions of 100 tpy of VOC and 10 tpy of formaldehyde. See memorandum from Mr. David Hughes dated March 24, 2009. This stack test report indicated the formaldehyde emissions rate was **0.193 lb/hr** per engine.

Permit **09604R02**, issued on April 14, 2010 was for four additional engines bringing the total to seven 4,735 hp Caterpillar engines with catalytic oxidizers as controls:

- four natural gas-fired, four-stroke lean burn (4SLB) reciprocating internal combustion Caterpillar Model No. G3616LE engines (RICE) with spark ignition all rated at 4,735 horsepower (hp), each driving natural gas compressors (ID Nos. COMP04, COMP05, COMP06 and COMP07). These engine's emissions were controlled with catalytic oxidizers (ID Nos. COMP04C, COMP05C, COMP06C and COMP07C)

The three original units have **6.7 cubic feet** of catalyst each. The after control emission rate of formaldehyde of **0.193 lb/hr** per engine was determined by stack testing two of the three identical engines. The four new units though the same size and the same manufacturer have substantially larger catalysts (**24.0 cubic feet**) therefore emissions are probably less than **0.193 lb/hr** per engine as established by the test. Testing of one of the new identical units was required by this permit. Assuming all the Caterpillar engines have the same after control emissions rate the existing and new catalytic oxidizers, with proper maintenance and operation should ensure PNG will remain an area source for all HAPs including formaldehyde.

Permit **09604R03**, issued on September 1, 2010 was for administratively correcting the permit. The first application indicated the MACT ZZZZ major source provisions applied, therefore, the major source provisions appeared in 09604R02. This MACT has combined major and area source requirements; the last revisions were August 2010. It was finally determined major source

provisions do not apply. The facility is a minor source for HAP emissions when after control emissions were considered in combination with enforceable permit limits proposed in this application for administrative amendment.

The application for proposed Permit **09604T04**, was required by the previous application in conformance with 2Q .0504(d). The application submitted on November 24, 2010 was for the 1st time title V permit. The purpose of the application was to:

- Revise the NAA/PSD avoidance conditions.
- Evaluate the applicability of the RICE MACT Subpart ZZZZ and the NSPS Subpart JJJJ to the entire facility.
- Correct the previous assumption that the seven large engines were “certified engines” by the manufacturer.

5. Emissions Sources and Equipment:

| Emission Source I.D. No. | Emission Source Description | Control Device I.D. No. | Control Device Description |
|--------------------------------------|--|--------------------------------|--|
| COMP01 RACT MACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP01C | catalytic oxidizer (24.0* cubic feet of oxidation catalyst) |
| COMP02 RACT MACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP02C | catalytic oxidizer (24.0*) cubic feet of oxidation catalyst) |
| COMP03 RACT MACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP03C | catalytic oxidizer (24.0*) cubic feet of oxidation catalyst) |
| EG01 MACT | natural gas-fired four cycle lean burn emergency generator (574 kW / 770 hp maximum rating) | N/A | N/A |

| Emission Source I.D. No. | Emission Source Description | Control Device I.D. No. | Control Device Description |
|---------------------------------|--|--------------------------------|---|
| COMP04 NSPS MACT RACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP04C | catalytic oxidizer (24.0) cubic feet of oxidation catalyst) |
| COMP05 NSPS MACT RACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP05C | catalytic oxidizer (24.0) cubic feet of oxidation catalyst) |
| COMP06 NSPS MACT RACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP06C | catalytic oxidizer (24.0) cubic feet of oxidation catalyst) |
| COMP07 NSPS MACT RACT | natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (4,735 horsepower rating) powering a compressor | COMP07C | catalytic oxidizer (24.0) cubic feet of oxidation catalyst) |

* The applicant is authorized to replace the existing 6.70 cubic feet oxidation catalyst with a 24.0 cubic feet unit. The replacement is required to comply with NSPS JJJJ by the future compliance date.

6. Regulatory Applicability Analysis:

A. One natural gas-fired four cycle lean burn emergency generator (574 kW / 770 hp maximum rating, ID No. EG01)

The following table provides a summary of limits and standards for the emission source(s) describe above:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|----------------------------|-------------------------|------------------------------|
| | | |

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|-------------------------------|--|
| Sulfur dioxide | See 4. A. | 15A NCAC 2D .0516 |
| Visible emissions | See 4. A.. | 15A NCAC 2D .0521 |
| Carbon Monoxide (formaldehyde surrogate) | Work and Management Practices | 15A NCAC 2D .1111 40 CFR Part 63 Subpart ZZZZ |
| Carbon monoxide Volatile Organic Compounds Nitrogen oxide | See 4. A. | 15A NCAC 2Q .0317 (PSD and NAA/NSR Avoidance) |
| Formaldehyde | See 4. A. | 15A NCAC 2Q .0317 (HAP Major Source Classification - Avoidance) |

1. 40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

This rule applies to affected source at area sources. This is existing stationary RICE as it was constructed before June 12, 2006. The compliance date is October 19, 2013. There are notification requirements. Installation of an hour meter is required. Idling time is restricted, oil changes are required. Non emergency operation is also limited while emergency operation is not. Recordkeeping is required for maintenance and malfunctions. Specifically Table 2d requires oil changes, spark plug inspection, hose and belt inspection. Table 6 requires operating in conformance with manufacturer recommendations and developing and following a maintenance plan.

Compliance is indicated.

B. Three natural gas-fired, four-cycle lean burn internal combustion reciprocating engines (4,735 horsepower rating each) powering three compressors (ID Nos. COMP01-COMP03 with three associated oxidation catalysts with 24.0 cubic feet of catalyst each (ID Nos. COMP01C-COMP03C)

The following table provides a summary of limits and standards for the emission source(s) describe above:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|----------------------------|-------------------------|------------------------------|
| Sulfur dioxide | See 4. A. | 15A NCAC 2D .0516 |

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| Visible emissions | See 4. A. | 15A NCAC 2D .0521 |
| Carbon Monoxide (formaldehyde surrogate) | <ul style="list-style-type: none"> • Maintain catalyst pressure drop in the range of 2 inches \pm 10% as measured in initial test • Maintain temperature inlet > 450oF and < 1350 oF • Limit concentration of CO 47 ppmvd @ 15%O₂; or Reduce CO by 93% | 15A NCAC 2D .1111 40 CFR Part 63 Subpart ZZZZ |
| Nitrogen oxides | See 4. A. Compliance with RACT requirements was demonstrated using engine guaranteed emission rates | 15A NCAC 2D .1423 |
| Carbon monoxide Volatile Organic Compounds Nitrogen oxide | See 4. A. | 15A NCAC 2Q .0317 (PSD and NAA/NSR Avoidance) |
| HAPs | See 4. A. | 15A NCAC 2Q .0317 (HAP(Major Source Classification - Avoidance) |

1. 40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

This rule applies to affected source at area sources. These are existing stationary RICE as they were constructed before June 12, 2006. The compliance date is October 19, 2013. There are emission and operating limitations. Initial testing is required by Table 4 within 180 days of the compliance date. Table 3 requires subsequent performance tests every 8,760 hours or 3 years whichever occurs first. The applicant may choose to limit formaldehyde or CO. Table 2b requires these units to limit or reduce CO emissions using an oxidation catalyst. The pressure drop and a minimum and a maximum temperature is required to be maintained and monitoring is required by installing a CPMS. Reporting is required by Table 7 including a compliance report addressing deviations and the CPMS. Note the applicant proposes to replace the current 6.70 cubic feet oxidation catalyst with a 24.0 cubic feet catalyst.

Compliance is indicated.

C. Four natural gas-fired, four-cycle lean burn internal combustion reciprocating engines (4,735 horsepower rating each) powering four compressors (ID Nos. COMP04-COMP07) with four associated catalytic oxidizers with 24.0 cubic feet of oxidation catalysts each (ID Nos. COMP04C-COMP07C)

The following table provides a summary of limits and standards for the emission source(s) describe above:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|--|
| Sulfur dioxide | See 4. A. | 15A NCAC 2D .0516 |
| Visible emissions | See 4. A. | 15A NCAC 2D .0521 |
| Nitrogen oxides | <i>Engine manufacture date after 7/1/2010 :</i> 1.0 g/HP-hr - 82ppmvd @ 15% O ₂ | 15A NCAC 2D .1100 40 CFR Part 60, Subpart JJJJ |
| Carbon Monoxide | 2.0 g/HP-hr - 270 ppmvd @ 15% O ₂ | |
| Volatile organic compounds | 0.7 g/HP-hr - 60 ppmvd @ 15% O ₂ | |
| Carbon Monoxide (formaldehyde surrogate) | Stationary RICE subject to Regulations under 40CFR Part 60 – the requirements of this subpart are met by meeting the requirements of Subpart JJJJ | 15A NCAC 2D .1111 40 CFR Part 63 Subpart ZZZZ |
| Nitrogen oxides | See 2.2 A. 5. Compliance with RACT requirements was demonstrated using engine guaranteed emission rates | 15A NCAC 2D .1423 |
| Carbon monoxide Volatile Organic Compounds Nitrogen oxide | See 4. A. | 15A NCAC 2Q .0317 (PSD and NAA/NSR Avoidance) |
| HAPs | See 4. A. | 15A NCAC 2Q .0317 (HAP Major Source Classification-Avoidance) |

1. 40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

This rule applies to affected sources at an area source. These are new stationary RICE as they will be constructed after June 12, 2006. These new stationary RICE meet the requirements of

this part by meeting the requirements of 40 CFR part 69 subpart JJJJ for spark ignition engines.

2. 40 CFR Part 60- Subpart JJJJ- New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines

This rule applies to manufacturers and owner/operators. These emission units will commence construction (ordered) after June 12, 2006 and will be manufactured after July 1, 2007 (>500 HP). Owner/operators engine manufactured before January 1, 2011 may waive the CO emission standard if the engines are certified as per 40 CFR 1048. Otherwise the engines must meet the emission standards of 40 CFR 1048.101. These engines were determined to be not certified engines. The engines are required to be tested for NOx, CO and VOC and demonstrate compliance with the standards. Test results are required to be submitted within 60 days after the test. Owner/operators of non-certified engines must submit initial notifications as per §60.7(a)(1). Owner/operators must keep maintenance plan and records of records of conducted maintenance, maintain and operate the engines in a manner consistent with good air pollution practice. In addition owner/operators must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. It is expected air-to-fuel ratio controllers will be used with the operation of three way catalysts. The AFR controller must be maintained according the engine and control device manufacturer to minimize emissions. Compliance is indicated.

7. Regulatory Applicability Analysis for Multiple Sources:

A. Three natural gas-fired, four-cycle lean burn internal combustion reciprocating engines (4,735 horsepower rating each) powering three compressors (ID Nos. COMP01-COMP03) with three associated catalytic oxidizers with 24.0 cubic feet of oxidation catalyst each (ID Nos. COMP01C-COMP03C)

Four natural gas-fired, four-cycle lean burn internal combustion reciprocating engines (4,735 horsepower rating each) powering four compressors (ID Nos. COMP04-COMP07) with associated catalytic oxidizers with 24.0 cubic feet of oxidation catalysts each (ID Nos. COMP04C-COMP07C)

One natural gas-fired four cycle lean burn emergency generator (574 kW / 770 hp maximum rating, ID No. EG01)

The following table provides a summary of limits and standards for the emission source(s) describe above:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|----------------------------|---------------------------------------|------------------------------|
| Sulfur dioxide | 2.3 pounds per million Btu heat input | 15A NCAC 2D .0516 |
| Visible emissions | 20 percent opacity | 15A NCAC 2D .0521 |

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|--|---|
| Nitrogen oxides | <i>For seven 4SLB engines (ID Nos. COMP01 - COMP07):</i> nitrogen dioxide 125 ppm corrected to 15 percent ppmv stack gas oxygen on a dry basis. | 15A NCAC 2D .1423 |
| Carbon monoxide Volatile Organic Compounds Nitrogen oxide | <i>For three 4SLB engines (ID Nos. COMP01 - COMP03) and one emergency 4SLB engine (ID No. EG01):</i> CO Emission limit (tons per 12 month period) 250 NO _x and VOC Emission limits (tons per 12 month period) 100 <i>For four 4SLB engines (ID Nos. COMP04 - COMP07):</i> NO _x , CO, and VOC Emission limits (tons per 12 month period) 100 | 15A NCAC 2Q .0317 (PSD and NAA/NSR Avoidance) |
| HAPs | <i>For seven 4SLB engines (ID Nos. COMP01 - COMP07) and one emergency 4SLB engine (ID No. EG01):</i> Formaldehyde emissions limits (tons per 12 month period) 10 | 15A NCAC 2Q .0317 (HAP Major Source Classification - Avoidance) |

1. 15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

- a. Emissions of sulfur dioxide from the 4SLB engines (**ID Nos. COMP01 through COMP07 and EG01**) shall not exceed **2.3 pounds per million Btu heat input**. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard. [15A NCAC 2D .0516]
- b. Natural gas is the only fuel fired at this facility. Natural gas is inherently low in sulfur compounds therefore the standard will never be violated. Monitoring recordkeeping and reporting are not required. Compliance is indicated.

2. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS

- a. Visible emissions from the 4SLB engines (**ID Nos. COMP01 through COMP07 and EG01**) shall not be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging 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. [15A NCAC 2D .0521(d)]

- b. Natural gas is the only fuel fired at this facility. Firing of natural gas rarely results in emissions that exceed the standard. Generally there are no visible emissions associated with natural gas firing. Monitoring recordkeeping and reporting are not required. These units have history of compliance. Compliance is indicated.

**3. 15A NCAC 2Q .0317: AVOIDANCE CONDITIONS for
15A NCAC 2D .0531: SOURCES IN NONATTAINMENT AREAS and
15A NCAC 2D .0530: PREVENTION OF SIGNIFICANT DETERIORATION**

- a. In order to avoid applicability of 15A NCAC 2D .0530 (g) for major sources and major modifications, the **three** natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (**4,735 hp each, ID Nos. COMP01-COMP03**) and **one** natural gas-fired four cycle lean burn emergency generator (**545 kW /770 hp maximum rating, ID No. EG01**) shall discharge into the atmosphere **less than 100 tons of NO_x and 100 tons of VOC**, per consecutive 12-month period [15A NCAC 2D .0531]; and **less than 250 tpy of CO**, per consecutive 12-month period [15A NCAC 2D .0530].

b. Applicability Analysis for NAA/NSR

The area in which the facility is located the area was designated as non attainment for the 1997 8-hour ozone standard on April 15, 2004. Avoidance conditions are required otherwise the facility would be subject to both the Non-Attainment Area and the New Source Review as found in 40 CFR 51.166 and 52:

NSR PSD Pollutant - Carbon Monoxide

This facility was, before the permit authorizing construction of the four additional engines, a synthetic minor source for title V purposes. An enforceable 100 tpy limit considering controls for CO emissions was required to avoid 40 CFR Part 70 and the title V program. When four new engines were proposed the entire facility could no longer avoid the title V program. Therefore a permit was issued whereby the facility entered into the title V program (first step of a two step process). The 100 tpy title V limit on the existing facility was replaced with a 250 tpy limit to avoid PSD and NSR review. Since the facility's potential to emit from existing sources exceeds 250 tpy before control a 250 tpy limit considering controls is required. (An additional 250 tpy limit considering controls was required on the facility's new sources to avoid PSD/NSR since the potential to emit also exceeds 250 tpy).

NSR PSD and NAA Pollutant – Volatile Organic Compounds

This facility was, before the permit authorizing construction of the four additional engines, a synthetic minor source for title V purposes and to avoid NAA review. When four new engines were proposed the entire facility could no longer avoid the title V program and was potentially subject to NAA review. Therefore a permit was issued whereby the facility entered into the title V program (first step of a two step process). The 100 tpy title V limit on the existing facility was replaced with a 100 tpy limit to avoid PSD and NSR review and NAA review. Since the facility's potential to emit from existing sources exceeds 100 tpy before control a 100 tpy limit considering controls is required. (An additional 100 tpy limit considering controls was required on the facility's new sources to avoid NAA review since the potential to emit also exceeds 100 tpy).

NSR PSD and NAA Pollutant – Nitrogen Oxides

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4. **15A NCAC 2Q .0317: AVOIDANCE CONDITIONS for
15A NCAC 2D .0531: SOURCES IN NONATTAINMENTAREAS and
15A NCAC 2D .0530: PREVENTION OF SIGNIFICANT DETERIORATION**
 - a. In order to avoid applicability of 15A NCAC 2D .0530 (g) for major sources and major modifications, the **four** natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (**4,735 hp each, ID Nos. COMP04-COMP07**) shall discharge into the atmosphere **less than 100 tons of NOx and 100 tons of VOC**, per consecutive 12-month period [15A NCAC 2D .0531]; and **less than 250 tpy of CO**, per consecutive 12-month period [15A NCAC 2D .0530].
 - b. See 4.A. 3. above

5. **15A NCAC 2Q .0317: AVOIDANCE CONDITIONS for
40 CFR Subpart ZZZZ Reciprocating Internal Combustion Engines (HAP Major Source Classification Avoidance)**
 - a. In order to avoid applicability of 15A NCAC 2D .1111 for major sources, the **seven** natural gas-fired, four-cycle lean burn internal combustion reciprocating engine (**4,735 hp each,**) and one natural gas-fired four cycle lean burn emergency generator (**545 kW /770 hp maximum rating, ID No. EG01**) shall discharge into the atmosphere **less than 10 tons of Formaldehyde**, per consecutive 12-month period [15A NCAC 2D .1111].
 - b. **Applicability Analysis for Avoiding the Major Source Provisions of MACT Subpart ZZZZ**

Formaldehyde emissions from the emergency engine may be determined from the emission factor from manufacturer or AP-42 and the hours of operation. The emissions from the existing engines may be determined using the emission factor from the stack test and the hours of operation. When the oxidation catalyst is replaced to comply with MACT Subpart ZZZZ testing for CO is required and the oxidation catalyst will be monitored using a CPMS. When the new engines begin operation they are required to be tested for CO too. EPA considers CO a surrogate for formaldehyde and oxidation catalyst effective in reducing formaldehyde when maintained and operated properly. The formaldehyde emissions shall be limited by following the required monitoring associated with Subpart JJJJ for the new engines AFC air fuel controller and Subpart ZZZZ for the existing engines CPMS.

6. 15A NCAC 2D .1423 LARGE INTERNAL COMBUSTION ENGINES

- a. This Rule applies to the following internal combustion engines permitted after October 30, 2000 that are subject to Rule .1418 of this Section but are not subject to Rules .0530 (prevention of significant deterioration) or .0531 (nonattainment area major new source review) of this Subchapter:
 - (1) lean burn stationary internal combustion engines rated at equal or greater than 2,400 brake horsepower;
- b. Emission limitation. The owner or operator of a stationary internal combustion engine shall not cause to be emitted into the atmosphere nitrogen oxides in excess of the following applicable limit, expressed as nitrogen dioxide corrected to 15 percent parts per million by volume (ppmv) stack gas oxygen on a dry basis, averaged over a rolling 30-day period, as may be adjusted under Paragraph (c) of this Rule:

MAXIMUM ALLOWABLE EMISSION CONCENTRATION FOR STATIONARY INTERNAL COMBUSTION ENGINES (parts per million)

| Engine Type | Limitation |
|-------------|------------|
| Lean-burn | 125 |

- c. A review of the Caterpillar engine specifications and actual emissions testing indicates the emissions from the three existing engines Model No. G3616 and the Caterpillar engine specification for the four new engines Model No. G3616 LE all indicate NOx emissions are and will be considerably less than the standard. In addition all the units will be subject to additional testing to comply with NESHAP ZZZZ and NSPS JJJJ. (The Permits Section requested concurrence with the compliance plan from the SSCB but had no response). Based on the compliance plan the Permit Section approved of plan and allowed for alternate monitoring based on actual testing, therefore, a CMS was not required.
- d. This rule has specific reporting of emissions during ozone season and reporting of the number of hours per day the engines operate and exclude emissions attributable to start up and shut downs not to exceed 36 hours.

10. Facility Compliance Status:

The last inspection was on October 19, 2010. The last inspection report by Mr. Westmoreland with MRO indicated the facility is in compliance.

11. Facility Emissions Review:

Based on the before control criteria pollutant potential emissions, this facility is classified as a major facility for part 70 title V and PSD NAA/NSR purposes but remains an area source for part 63 HAP emissions based on after control potential emissions and a federally enforceable permit condition. The facility has not been required to submit an emissions inventory at this time.

12. NSPS, NESHAPS, NAA/NSR, CAM, 112(r), PE Requirements, Zoning Consistency, and Attainment Status:

Based on the facility's potential emissions this facility is a NAA/NSR major source and a title V major source but remains a minor source for HAPs. The facility remains subject to NESHAPS/MACT but only to the area source provisions of the MACT after this administrative amendment. (The facility uses catalytic oxidizer controls on all engines thus after control potential emissions of any single HAP (i.e., formaldehyde) is less than 10 tpy and all combined HAPs are less than 25 tpy). A MACT ZZZZ avoidance condition now appears in the permit. PSD increment tracking is not required because there are no actual emissions increases or decreases associated with this permit. The facility is still not subject to CAM or 112(r) as a result of this permit. The zoning consistency determination and PE certification were submitted previously so are not required this time.

13. Facility-Wide RACT Review:

(This section was amended to address the NO_x RACT compliance demonstration)

With the addition of the four new engines this facility is considered a major source for NO_x and VOC for RACT purposes. This facility is located in the Metrolina non-attainment area; the area is classified as Moderate. A major source for RACT purposes in a Moderate area means the before controls emissions (BCE) are greater than the major source amounts of 100 tpy for VOC and NO_x. These pollutants are considered precursors of ozone formation. The existing facility consisting of three engines and an emergency engine (before the addition of the four new engines) appears to have been a synthetic minor source for VOC (major before control emissions) and a minor source for NO_x. The existing facility had emission limits for VOC in place to avoid NAA/NSR review thereby VOC RACT was avoided (NO_x emissions PTE was less than 100 tpy therefore NO_x RACT did not apply).

RACT Review for VOC Emissions

With the addition of the new units a second NSR/NAA VOC avoidance limitation was required. The DAQ determined, however, that RACT could not be avoided by taking a second 100 tpy VOC limit. All VOC emissions sources required a review to determine RACT applicability. All emissions units in the insignificant activity list were found to be “exempt” from RACT as emission were less than 15 lb/day each. All seven (identical) existing and proposed 4,735 Hp engines all have BCE VOC emissions of 6.26 lb/hr each. The existing units have 6.70 cubic feet of oxidation catalyst installed. The new engines will have 24.0 cubic feet of catalyst installed. The catalyst is effective at VOC reduction. NSPS Subpart JJJJ requires engines to have uncontrolled VOC emissions of 1.0 g/bhp-hr while the manufacturer specifications indicates emissions are actually 0.6 g/bhp-hr. (The rule also has limitations for NO_x and CO). The catalysts are technically feasible for VOC control. The three existing engines have a 50% reduction in VOC as per stack test. The new units were designed to obtain a 93% reduction in CO which corresponds to a 75% reduction in VOC according to the catalyst supplier.

The existing 4SLB spark ignition emergency engine does not have controls. Catalytic oxidation is a technically feasible option for VOC reduction. A search of the RACT/BACT Clearinghouse indicates internal combustion subject to BACT have “good combustion control” for VOC emissions. Since BACT is considered superior to RACT no further analysis was required.

The existing blowdown operations at this facility also have VOC emissions. Natural gas is released from the pipeline associated with the seven compressor stations for maintenance and malfunction purposes. The application indicates there are twelve named maintenance events and nine named malfunction events. The applicant included a natural gas analysis was included. The methane and ethane are not EPA regulated VOCs and so they were excluded from the analysis. The analysis indicates natural gas was found to only have 1.01% EPA regulated VOC. The total EPA regulated VOC emissions was 1.39 tons per year. This fugitive source was therefore found to be insignificant as per 2Q .0503(8).

RACT Review for NOx Emissions

All insignificant activities with emissions of less than 5 tpy are “exempt” from RACT by definition. The engine that is an emergency unit is categorically “exempt” from RACT by definition. The RACT Rule 2D .1423 applies. The previous permit required a compliance demonstration before the ozone season or operation. The compliance demonstration was submitted May 27, 2010. This rule requires the engines attain a NOx emissions rate of **125 ppm** at 15% O₂. The demonstration simply considered the manufacturers NOx emissions guarantees of **0.7 g/bhp-hr** or **62.2 ppmv** for the old engines and **63.7 ppmv** for the new engines. This is well below the emissions limit. Note that existing engines have been tested and the new engines will require testing. Compliance is indicated. The permit language was modified to acknowledge the requirement for an approved compliance demonstration was met. Since the compliance demonstration has been approved the requirement for CEMS was removed.

14. Facility-Wide Air Toxics:

The state enforceable toxic air pollutant regulations were amended to include combustion sources. The expanded facility will not be subject to these rules since the first step 300 permit was issued April 14, 2010. The rule appears to indicate a toxics review is required if a combustion source is new or modified after July 10, 2010. The engines (ID Nos. COMP01 through COMP07) and the emergency generator (ID No. EG01) remain exempt from toxics per 2Q .0702(a)(18) and 2Q .0703(6).

15. Applicant/Regional Office/EPA Comments

MRO 3/15/11 Comments:

1. In the cover letter of permit, the name in the salutation does not match the one in the address...should be Dear Mr. Myers.

Concur

2. In the equipment table of the permit, remove the “) “ after the 24.0 in the control device descriptions for COMP02C, COMP03C, COMP04C, COMP05C, COMP06C, and COMP07C.

Concur

3. In the review, remove Sections 8 and 9 as they are repeated on down in the review in Sections 13 and 14

Concur

4. In the review, update the last sentence of Section 13.

Concur

This space reserved for comments and responses

16. Public Notice and EPA Review

The modification was considered significant and was noticed in a newspaper of general circulation. Additionally the revised permit was “proposed” to EPA for their review. The revised permit, as required, will be made available to affected States and those on the title V mailing list in accordance with 2Q .0515 provisions. The public notice and EPA concurrent review period of 30 and 45 days respectively is required.

17. The GHG Tailoring Rule

If a minor source (PNG in this case) construction permit is issued before July 1, 2011, which does not contain synthetic minor limitations on GHG emissions AND the source or modification has a PTE of GHG emissions that would trigger PSD on or after July 1, 2011, then the minor source must begin actual construction before July 1, 2011 or seek a permit revisions to include a minor source limit for the GHG emissions, otherwise a PSD permit for GHGs will be required.

Compliance with all regulations is indicated. This engineer recommends the permit **09604T05** be issued.