# INITIAL TITLE V AIR PERMIT APPLICATION REVIEW

| APPLICANT: | SITE LOCATION: | | COUNTY: |
|---|---|---|---|
| Roanoke Valley Energy Facility | Weldon | | Halifax |
| **TECHNICAL CONTACT:** | **PHONE:** | **RESPONSIBLE OFFICIAL:** | **TITLE:** |
| Chris Hews | 252-536-3200 | Bruce Hamilton | Vice President |
| **REVIEW ENGINEER:** | **SIGNATURE:** | | **DATE:** |
| Lesley Biller/Jenny Sheppard | | | |
| **REGIONAL CONTACT:** | **REGIONAL OFFICE:** | | **SIC CODE:** |
| Charles McEachern | RRO | | 4931 |
| **APPLICATION NUMBER:** | **EXISTING PERMIT NUMBER:** | | **NEW PERMIT NUMBER:** |
| 420174A5.A | 06964R11 | | 06964T12 |

## I. Introduction

The U.S. Environmental Protection Agency (EPA) has given a full approval to North Carolina's Title V operating permits program effective on October 1, 2001. Title V facilities are required to obtain an operating permit which addresses all applicable regulations under the State Implementation Plan, Federal Implementation Plan, and other provisions of the Clean Air Act (CAA). The Title V Operating Permit will define all of the facility's obligations under the CAA.

This Initial Title V Air Permit Application Review intends to convey all pertinent emissions data, rules, policies, and engineering assumptions used to construct the DRAFT Title V operating permit. The primary source of information used to construct the DRAFT permit is the above referenced air permit application and the existing air permits.

## II. Background Information

Pursuant to 15A NCAC 2Q .0506, LG&E Power, Inc., Roanoke Valley Project (RVP) submitted its initial Title V application to the DAQ on February 13, 1996. The application was considered complete for processing on February 13, 1996.

The Title V operating permit will replace an existing Air Quality Construction and Operation Permit No. 06964R11, which was issued on October 4, 2000 and is currently scheduled to expire on September 30, 2005. RVP is subject to the Title V program due to emissions of particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and hazardous air pollutants exceeding the major source thresholds.

## III. Facility Description

RVP is a cogeneration facility that generates electrical power using coal-fired boilers. There are two coal-fired boilers with capacities of 1700 and 560 million Btu per hour heat input. Other permitted sources include one start-up boiler, receiving and handling equipment for coal, lime, and flyash, a fuel oil storage tank, and two engines.

## IV. Statement of Compliance

The DAQ has reviewed the compliance status of this facility. Based on its latest inspection (9/25/02), the facility was in compliance with all applicable requirements. The applicant has certified that the facility will be in compliance with all applicable requirements at the time of permit issuance and will continue to comply with these requirements. The applicant has also certified that the facility will be in compliance with any applicable requirements taking effect during the term of the permit and will meet such requirements on a timely basis.

## V. Summary of Emission Sources and Control Devices

The following table identifies all emission sources and associated control devices for which the Initial Title V Operating Permit is being issued.

| Emission Source I.D. No. | Emission Source Description | Control Device I.D. No. | Control Device Description |
|---|---|---|---|
| E-1<br>**NSPS**<br>**PSD** | one pulverized coal-fired boiler (1,700 million Btu per hour heat input capacity, 1,250,000 pounds steam generating capacity, 165 megawatts net output electrical generating capacity) | EC-1A | one coal/No. 2 fuel oil-fired low NOx burner system with advance over-fire air (141,660 pounds per hour coal firing capacity, 1,700 million Btu per hour coal heat input rate capacity, 1,816 gallons per hour and 256 million Btu per hour No. 2 fuel oil start-up firing capacity) |
| | | EC-1B | one dry lime spray dryer flue gas desulfurization system (5,400 pounds per hour of lime injection rate) |
| | | EC-1C | one fabric filter (302,032 square feet of filter area) |
| E-2<br>**NSPS**<br>**PSD** | one No. 2 fuel oil-fired start-up boiler (25 million Btu per hour heat input capacity) | EC-2 | one low NOx burner design |
| E-15<br>**NSPS**<br>**PSD** | one pulverized coal-fired boiler (560 million Btu per hour heat input capacity, 434,300 pounds steam generating capacity, 45.1 megawatts net output electrical generating capacity) | EC-15A | one coal/No. 2 fuel oil-fired low NOx burner system with advance over-fire air and selective non-catalytic reduction (46,667 pounds per hour coal firing capacity, 560 million Btu per hour coal heat input rate capacity, 550 gallons per hour and 77.6 million Btu per hour No. 2 fuel oil start-up firing capacity) |
| | | EC-15B | one circulating fluidized bed dry lime scrubber flue gas desulfurization system (1,972 pounds per hour of lime injection rate) |
| | | EC-15C | one fabric filter (59,282 square feet of filter area) |
| Coal receiving, handling, and storage operations (ID No. ES-COAL1) for boiler E-1 consisting of: | | | |
| E-3<br>**NSPS**<br>**PSD** | a partially enclosed pull-through, railcar off-loading operation with four track hoppers (65 tons maximum capacity each) | EC-3 | chemical binder/water sprays installed on four track hoppers |

| Emission Source I.D. No. | Emission Source Description | Control Device I.D. No. | Control Device Description |
|---|---|---|---|
| E-4<br>**NSPS**<br>**PSD** | enclosed (inside building) coal crushing operations (two crushers, 300 tons per hour total maximum crushing capacity) | EC-4 | chemical binder/water sprays |
| E-5<br>**PSD** | a coal stacker tube (1,000 tons per hour capacity) installed on one open short term coal storage pile | EC-5 | chemical binder/water sprays |
| E-24<br>**PSD** | one long-term coal storage pile (30-day supply) | EC-24 | chemical binder/water sprays |
| E-6<br>**NSPS**<br>**PSD** | four coal storage silos (280 tons storage capacity each) | EC-6a<br><br>EC-6b | four fabric filters (84 square feet of filter area each) installed one on each silo<br><br>enclosed within boiler/turbine building for control of fugitive emissions |
| E-10<br>**PSD** | enclosed coal sampling building operation | NA | NA |
| Lime receiving, storage, and recycling operations (ID No. ES-LIME1) for boiler E-1 consisting of: | | | |
| E-7<br>**PSD** | one lime surge bin | EC-7 | one bagfilter (1040 square feet of filter area) |
| E-11<br>**PSD** | one lime storage silo (400 tons storage capacity) | EC-11 | one bagfilter (1767 square feet of filter area) |
| E-8<br>**PSD** | one lime recycling bin | EC-8a | one bagfilter (636 square feet of filter area) |
| E-8b<br>**PSD** | one lime recycling bin | EC-8b | one bagfilter (106 square feet of filter area) |
| Flyash/spent lime storage and handling operations (ID No. ES-FLYASH1) for boiler E-1 consisting of: | | | |
| E-12<br>**PSD** | two flyash filter receiver | EC-12 | two bagfilters (1295 square feet of filter area each) |
| E-9<br>**PSD** | two ash storage silos | EC-9 | two bagfilters (954 square feet of filter area each) |
| E-9b<br>**PSD** | two flyash/spent lime silo loadout operations | EC-9b | two enclosed ash moisture conditioning systems each with flexible chute and door flaps installed one each on the |

| Emission Source I.D. No. | Emission Source Description | Control Device I.D. No. | Control Device Description |
|---|---|---|---|
| Support equipment consisting of: | | | |
| T01<br>**NSPS**<br>**PSD** | one atmospheric vent installed on one fixed roof No. 2 fuel oil storage tank (35,000 gallon capacity) | NA | NA |
| E-14 | one 1135 horsepower auxiliary generator engine with 275 gallon No. 2 fuel oil tank | NA | NA |
| Coal receiving, handling, and storage operations (ID No. ES-COAL15) for boiler E-15 consisting of: | | | |
| E-23<br>**NSPS**<br>**PSD** | enclosed coal conveying system | EC-23 | chemical binder/water sprays |
| E-16<br>**NSPS**<br>**PSD** | enclosed (inside building) coal crushing operation (two crushers, 300 tons per hour total maximum crushing capacity) | EC-16 | chemical binder/water sprays |
| E-17<br>**NSPS**<br>**PSD** | three coal storage silos (130 tons storage capacity each) | EC-17 | three fabric filters (84 square feet of filter area each) installed one on each silo |
| Lime receiving, storage, and recycling operations (ID No. ES-LIME15) for boiler E-15 consisting of: | | | |
| E-18<br>**PSD** | one hydrated lime storage silo | EC-18 | one bagfilter (1178 square feet of filter area) |
| E-22<br>**PSD** | one hydrated lime surge tank | EC-22 | one bagfilter (630 square feet of filter area) |

**VI. Emission Source-by-Source Evaluation**

**A. One pulverized coal-fired boiler (ID No. E-1) with associated low NOx burner system with advance over-fire air (ID No. EC-1A), dry lime spray dryer flue gas desulfurization system (ID No. EC-1B), and fabric filter (ID No. EC-1C)**

1. Description

This is a pulverized coal fired boiler which began operation in 1994. No. 2 fuel oil used for start-up.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| **Regulated Pollutant** | **Limits/Standards** | **Applicable Regulation** |
|---|---|---|
| particulate matter | 0.02 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| PM10 | 0.018 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| visible emissions | 20 percent opacity (six-minute average, except for one six-minute period per hour of not more than 27 percent opacity) | 15A NCAC 2D .0530 |
| sulfur dioxide | 0.213 pounds per million Btu heat input and 92 percent sulfur dioxide reduction (30-day rolling average) | 15A NCAC 2D .0530 |
| nitrogen oxides | 0.33 pounds per million Btu heat input (30-day rolling average) | 15A NCAC 2D .0530 |
| carbon monoxide | 0.20 pounds per million Btu heat input (24-hour average) | 15A NCAC 2D .0530 |
| volatile organic pollutants | 0.03 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| arsenic | $1.72 \times 10^{-5}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| beryllium | $1.10 \times 10^{-7}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| fluorides | $5.38 \times 10^{-4}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| radionuclides | $6.61 \times 10^{-7}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| particulate matter | 0.147 pounds per million Btu heat input | 15A NCAC 2D .0503 |
| nitrogen oxides | 1.8 pounds per million Btu heat input | 15A NCAC 2D .0519 |
| particulate matter | **Solid fuel:**<br>0.03 pounds per million Btu heat input and 99% reduction | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.42a (a)** |
| | **Liquid fuel:**<br>0.03 pounds per million Btu heat input and 70% reduction | |

| | | |
|---|---|---|
| sulfur dioxide | **Solid fuel:**<br>1.20 pounds per million Btu heat input and 90% reduction , or<br>0.60 pounds per million Btu heat input and 70% reduction | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.43a** |
| | **Liquid or gaseous fuel:**<br>0.80 pounds per million Btu heat input and 90% reduction | |
| | **Firing a combination of fuels:**<br>If $SO_2$ emissions are greater than 0.6 pounds per million Btu input:<br>Es = [0.80x + 1.20y]/100 and<br>%Ps = 10<br><br>If $SO_2$ emissions are less than 0.6 pounds per million Btu input:<br>Es = [0.80x + 1.20y]/100 and<br>%Ps = [10x + 30y]/100<br><br>Es is the prorated sulfur dioxide emission limit (lb/million Btu input)<br>%Ps is the percentage of potential sulfur dioxide emission allowed<br>x is the percentage of total heat input derived from the combustion of liquid fuels<br>z is the percentage of total heat input derived from the combustion of solid fuel | |
| nitrogen oxide | **Solid fuel:**<br>0.60 pounds per million Btu heat input and 65% reduction | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.44a (a)** |
| | **Liquid fuel:**<br>0.30 pounds per million Btu heat input and 30% reduction | |
| | **Firing a combination of fuels:**<br>En = [0.30x + 0.60z]/100<br><br>En is the applicable standard for nitrogen oxides when multiple fuels are combusted simultaneously (lb/million Btu input)<br>x is the percentage of total heat input derived from the combustion of fuels subject to the 0.30 lb/million Btu limit<br>z is the percentage of total heat input derived from the combustion of fuels subject to the 0.60 lb/million Btu limit | |
| opacity | 20 percent (six-minute average, except for one six-minute period per hour of not more than 27 percent opacity) | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.42a (b)** |
| nitrogen oxides | 447 tons beginning May 31, 2004 and ending September 30, 2004<br>558 tons beginning May 1, 2005 and ending September 30, 2005<br>493 tons beginning May 1, 2006 and ending September 30, 2006<br>493 tons beginning May 1, and ending September 30, for following years | 15A NCAC 2D .1400 |

a. 2D .0530 "Prevention of Significant Deterioration"

i.) Regulation Analysis

This facility has undergone a PSD analysis in the past. Compliance was demonstrated with the limits for PM, PM10, VOC, arsenic, beryllium, fluorides, and radionuclides during the initial stack testing. Compliance is demonstrated for opacity, SO2, and NOx through continuous emissions monitors. Compliance was demonstrated for CO during stack testing in 1997.

Emissions of particulate matter are controlled by a fabric filter. The fabric is fiberglass and it is cleaned by reverse flow. The filter area is 303,032 square feet and the air flow rate 475,000 ACFM. The air-to-cloth ratio is 1.57:1, which is within the appropriate range.

Emissions of NOx are controlled by a low NOx burner system with advance over-fire air. Emissions of SO2 are controlled by a dry lime spray dryer absorber. Three rotary atomizers spray lime slurry into a reactor vessel where it is dried by the heat from the flue gas while removing SO2.

ii.) Monitoring/Recordkeeping Requirements

CEMs are required for opacity, SO2, NOx, and CO2 or O2. Sulfur dioxide emissions shall be controlled by a dry lime spray dryer and fabric filter combination having a minimum of 92 percent control efficiency. The maximum sulfur content of the coal to be burned shall not exceed 1.6 percent by weight, per shipment. The Permittee shall maintain records of all coal shipments purchased, indicating sulfur and ash content per shipment. Nitrogen oxide (NOx) emissions shall be controlled by low NOx burners and advanced overfire air systems.

Particulate matter and $PM_{10}$ emissions shall be controlled by a fabric filter capable of achieving a 99.92 percent control efficiency. To ensure compliance with the PM and PM10 limits, the bagfilters will be inspected and maintained. A pressure gauge shall be maintained on the bagfilter and the Permittee shall record the pressure drop across the bagfilters at least once weekly. The fabric filter may be bypassed during No. 2 fuel oil firing start-ups to alleviate potential moisture damage to the filter at low start-up temperatures.

The maximum coal firing capacity shall not exceed 141,660 pounds of coal per hour and the maximum heat input when firing coal shall not exceed 1,700 million Btu per hour.

The firing of No. 2 fuel oil during start-up conditions (period during which the unit is firing exclusively No. 2 fuel oil and bypassing the emission control devices) shall not exceed a maximum of fifteen (15) hours during any one start-up period and a maximum of 750 hours of firing No. 2 fuel oil during any consecutive twelve month period. The hours of operation during start-up conditions (period during which the unit is firing exclusively No. 2 fuel oil and bypassing the emission control devices) shall be recorded in a logbook. The maximum firing of No. 2 fuel oil during start-up conditions shall not exceed 1,816 gallons per hour and 256 million Btu per hour heat input. The sulfur content of the No. 2 fuel oil shall not exceed 0.3 percent by weight. The No. 2 fuel oil shall not be fired simultaneously with coal during start-ups until all air cleaning devices are operational and combined exhaust gases are directed through the air cleaning systems.

iii.) Reporting Requirements

The Permittee shall submit a summary report of monitoring and recordkeeping activities within 30 days after each calendar year quarter.

b. <u>2D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"</u>

i.) Regulatory Analysis

This boiler is subject to 2D .0503 since coal is burned for the primary purpose of producing heat by indirect

heat transfer. Allowable emissions of particulate matter from fuel combustion shall be calculated as follows:

$$E = 1.090 (Q^{-0.2594}$$

where E = allowable particulate emission rate (pounds per million Btu), and
Q = maximum heat input rate (million Btu per hour)

The total maximum heat input of fuel firing indirect heat exchangers at this plant site (Q = 2285 million Btu per hour) established when these boilers came into operation is used to calculate the allowable emission limit, E = 0.147 pounds per million Btu heat input.

Compliance with this regulation is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

The monitoring, recordkeeping, and reporting requirements described above for regulation 2D .0530 will also ensure compliance with this regulation.

c. 2D .0519 "Control of Nitrogen Dioxide and Nitrogen Oxides Emissions"

i.) Regulatory Analysis

The emissions of nitrogen oxides shall not exceed 1.8 pounds per million Btu heat input from any coal-fired boiler with a capacity of 250 million Btu per hour or more. Compliance with this regulation is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

The monitoring, recordkeeping, and reporting requirements described above for regulation 2D .0530 will also ensure compliance with this regulation.

d. 15A NCAC 2D .0524: NSPS 40 CFR Part 60, Subpart Da

i.) 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 Part 60, Subpart Da, including Subpart A "General Provisions."[15A NCAC 2D .0524]

Emission Limitations [15A NCAC 2D .0524]
This boiler was constructed after September 18, 1978 and has a heat input capacity of greater than 250 million Btu per hour, so it is subject to this subpart.

Compliance with this regulation is indicated by compliance with the stricter limits in 2D .0530.

**Monitoring** [15A NCAC 2D .0524]

ii.) Continuous emissions monitors (CEM) for sulfur dioxide, nitrogen oxides, and opacity emissions shall be installed, calibrated, maintained, tested, and operated in accordance with 40 CFR Part 60 Appendix B "Performance Specifications" and Appendix F "Quality Assurance Procedures." The Permittee shall follow the monitoring requirements of 40 CFR § 60.47a.

**Recordkeeping/Reporting** [15A NCAC 2Q .0524]

iii.) The Permittee shall follow the recordkeeping and reporting requirements of 40 CFR § 60.49a.

e. 15A NCAC 2D .1400: NITROGEN OXIDES

Pursuant to 15A NCAC 2D .1417, the nitrogen oxide emissions from the coal fired boiler (ID No. E-1) shall not exceed the following:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| nitrogen oxides | 447 tons beginning May 31, 2004 and ending September 30, 2004<br>558 tons beginning May 1, 2005 and ending September 30, 2005<br>493 tons beginning May 1, 2006 and ending September 30, 2006<br>493 tons beginning May 1, and ending September 30, for following years | 15A NCAC 2D .1400 |

**Compliance Schedules** - Pursuant to 15A NCAC 2D .1403(d), the Permittee shall:

i. on or before October 1, 2003 submit to the Director a description of how the source will comply, which shall include an estimate of the number of tons of nitrogen oxide per ozone season, which may be a range, that will be obtained from the nitrogen oxide budget trading program under Rule .1419 of this Section to show compliance; and

ii. install and implement any required monitoring, recordkeeping, and reporting requirements before May 1, 2004; if a permit application is necessary to install and operate the monitor, the permit application shall be submitted, by October 1, 2003; if a permit application is not submitted, the Director shall modify the source's permit by January 1, 2004 to insert the monitoring, recordkeeping, and reporting requirements necessary to show compliance with this Section.

**Monitoring/Recordkeeping** - Pursuant to 15A NCAC 2D .1404, the Permittee shall install, operate, and maintain a continuous emission monitoring system according to 40 CFR Part 75, Subpart H, with such exceptions as may be allowed under 40 CFR Part 75, Subpart H or 40 CFR Part 96. In addition, Pursuant to 2D .1404(h) the Permittee shall comply with recordkeeping and reporting requirements of 40 CFR Part 96, Budget Trading for State Implementation Plans.

**Reporting Requirements** - Pursuant to 15A NCAC 2D .1404(g), starting in 2004, the Permittee shall report to the Director no later than July 30 the tons nitrogen oxides emitted during the previous May and June. No later than October 30, the owner or operator shall report to the director the tons of nitrogen oxides emitted during the previous ozone season.

**B. One pulverized coal-fired boiler (ID No. E-15) with associated low NOx burner system with advance over-fire air and selective non-catalytic reduction (ID No. EC-15A), circulating fluidized bed dry lime scrubber flue gas desulfurization system (ID No. EC-15B), and fabric filter (ID No. EC-15C)**

1. Description

This is a pulverized coal fired boiler which began operation in 1995. No. 2 fuel oil used for start-up.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| particulate matter | 0.02 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| PM10 | 0.018 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| visible emissions | 20 percent opacity (six-minute average, except for one six-minute period per hour of not more than 27 percent opacity) | 15A NCAC 2D .0530 |
| sulfur dioxide | 0.187 pounds per million Btu heat input (30-day rolling average) | 15A NCAC 2D .0530 |
| nitrogen oxides | 0.17 pounds per million Btu heat input and 93% $SO_2$ reduction (30-day rolling average) | 15A NCAC 2D .0530 |
| carbon monoxide | 0.20 pounds per million Btu heat input (24-hour average) | 15A NCAC 2D .0530 |
| volatile organic pollutants | 0.03 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| particulate matter | 0.147 pounds per million Btu heat input | 15A NCAC 2D .0503 |
| nitrogen oxides | 1.8 pounds per million Btu heat input | 15A NCAC 2D .0519 |
| particulate matter | **Solid fuel:** 0.03 pounds per million Btu heat input and 99% reduction | 15A NCAC 2D .0524 **40 CFR Part 60, Subpart Da §60.42a (a)** |
| | **Liquid fuel:** 0.03 pounds per million Btu heat input and 70% reduction | |

| | | |
|---|---|---|
| sulfur dioxide | **Solid fuel:**<br>1.20 pounds per million Btu heat input and 90% reduction , or<br>0.60 pounds per million Btu heat input and 70% reduction | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.43a** |
| | **Liquid or gaseous fuel:**<br>0.80 pounds per million Btu heat input and 90% reduction | |
| | **Firing a combination of fuels:**<br>If $SO_2$ emissions are greater than 0.6 pounds per million Btu input:<br>Es = [0.80x + 1.20y]/100 and<br>%Ps = 10<br><br>If $SO_2$ emissions are less than 0.6 pounds per million Btu input:<br>Es = [0.80x + 1.20y]/100 and<br>%Ps = [10x + 30y]/100<br><br>Es is the prorated sulfur dioxide emission limit (lb/million Btu input)<br>%Ps is the percentage of potential sulfur dioxide emission allowed<br>x is the percentage of total heat input derived from the combustion of liquid fuels<br>z is the percentage of total heat input derived from the combustion of solid fuel | |
| nitrogen oxide | **Solid fuel:**<br>0.60 pounds per million Btu heat input and 65% reduction | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.44a (a)** |
| | **Liquid fuel:**<br>0.30 pounds per million Btu heat input and 30% reduction | |
| | **Firing a combination of fuels:**<br>En = [0.30x + 0.60z]/100<br><br>En is the applicable standard for nitrogen oxides when multiple fuels are combusted simultaneously (lb/million Btu input)<br>x is the percentage of total heat input derived from the combustion of fuels subject to the 0.30 lb/million Btu limit<br>z is the percentage of total heat input derived from the combustion of fuels subject to the 0.60 lb/million Btu limit | |
| opacity | 20 percent (six-minute average, except for one six-minute period per hour of not more than 27 percent opacity) | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Da**<br>**§60.42a (b)** |
| nitrogen oxides | 142 tons beginning May 31, 2004 and ending September 30, 2004<br>178 tons beginning May 1, 2005 and ending September 30, 2005<br>167 tons beginning May 1, 2006 and ending September 30, 2006<br>167 tons beginning May 1, and ending September 30, for following years | 15A NCAC 2D .1400 |

a. 2D .0530 “Prevention of Significant Deterioration”

i.) Regulation Analysis

This facility has undergone a PSD analysis in the past. Compliance was demonstrated with the limits for PM, PM10, VOC, arsenic, and beryllium during the initial stack testing. Compliance is demonstrated for opacity, SO2, and NOx through continuous emissions monitors. Compliance was demonstrated for CO during stack testing in 1997.

Emissions of particulate matter are controlled by a fabric filter. The fabric is ryton and it is cleaned by reverse flow. The filter area is 59,282 square feet and the air flow rate 147,732 ACFM. The air-to-cloth ratio is 2.49:1, which is within the appropriate range.

Emissions of NOx are controlled by a low NOx burner system with advance over-fire air and SNCR. Emissions of SO2 are controlled by a circulating fluidized bed dry lime scrubber. Flue gas passes through a suspended column of hydrated lime which absorbs the SO2. The reacted lime and ash are then collected in a fabric filter.

ii.) Monitoring/Recordkeeping Requirements

CEMs are required for opacity, SO2, NOx, and CO2 or O2. Sulfur dioxide emissions shall be controlled by a circulating fluidized bed dry lime scrubber and fabric filter combination having a minimum of 93 percent control efficiency. The maximum sulfur content of the coal to be burned shall not exceed 1.6 percent by weight, per shipment. The Permittee shall maintain records of all coal shipments purchased, indicating sulfur and ash content per shipment. Nitrogen oxide (NOx) emissions shall be controlled by low NOx burners, advanced overfire air systems, and SNCR.

Particulate matter and $PM_{10}$ emissions shall be controlled by a fabric filter capable of achieving a 99.92 percent control efficiency. To ensure compliance with the PM and PM10 limits, the bagfilters will be inspected and maintained. A pressure gauge shall be maintained on the bagfilter and the Permittee shall record the pressure drop across the bagfilters at least once weekly. The fabric filter may be bypassed during No. 2 fuel oil firing start-ups to alleviate potential moisture damage to the filter at low start-up temperatures.

The maximum coal firing capacity shall not exceed 46,667 pounds of coal per hour and the maximum heat input when firing coal shall not exceed 560 million Btu per hour.

The firing of No. 2 fuel oil during start-up conditions (period during which the unit is firing exclusively No. 2 fuel oil and bypassing the emission control devices) shall not exceed a maximum of fifteen (15) hours during any one start-up period and a maximum of 750 hours of firing No. 2 fuel oil during any consecutive twelve month period. The hours of operation during start-up conditions (period during which the unit is firing exclusively No. 2 fuel oil and bypassing the emission control devices) shall be recorded in a logbook. The maximum firing of No. 2 fuel oil during start-up conditions shall not exceed 550 gallons per hour and 77.6 million Btu per hour heat input. The sulfur content of the No. 2 fuel oil shall not exceed 0.3 percent by weight. The No. 2 fuel oil shall not be fired simultaneously with coal during start-ups until all air cleaning devices are operational and combined exhaust gases are directed through the air cleaning systems.

iii.) Reporting Requirements

The Permittee shall submit a summary report of monitoring and recordkeeping activities within 30 days after each calendar year quarter.

b. 2D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"

i.) Regulatory Analysis

This boiler is subject to 2D .0503 since coal is burned for the primary purpose of producing heat by indirect heat transfer. Allowable emissions of particulate matter from fuel combustion shall be calculated as follows:

$$E = 1.090 ( Q^{-0.2594}$$

where E = allowable particulate emission rate (pounds per million Btu), and
Q = maximum heat input rate (million Btu per hour)

The total maximum heat input of fuel firing indirect heat exchangers at this plant site (Q = 2285 million Btu per hour) established when these boilers came into operation is used to calculate the allowable emission limit, E = 0.147 pounds per million Btu heat input.

Compliance with this regulation is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

The monitoring, recordkeeping, and reporting requirements described above for regulation 2D .0530 will also ensure compliance with this regulation.

c. 2D .0519 "Control of Nitrogen Dioxide and Nitrogen Oxides Emissions"

i.) Regulatory Analysis

The emissions of nitrogen oxides shall not exceed 1.8 pounds per million Btu heat input from any coal-fired boiler with a capacity of 250 million Btu per hour or more. Compliance with this regulation is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

The monitoring, recordkeeping, and reporting requirements described above for regulation 2D .0530 will also ensure compliance with this regulation.

d. 15A NCAC 2D .0524: NSPS 40 CFR Part 60, Subpart Da

i.) 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 Part 60, Subpart Da, including Subpart A "General Provisions."[15A NCAC 2D .0524]

Emission Limitations [15A NCAC 2D .0524]
This boiler was constructed after September 18, 1978 and has a heat input capacity of greater than 250 million Btu per hour, so it is subject to this subpart.

Compliance with this regulation is indicated by compliance with the stricter limits in 2D .0530.

**Monitoring** [15A NCAC 2D .0524]

ii.) Continuous emissions monitors (CEM) for sulfur dioxide, nitrogen oxides, and opacity emissions shall be installed, calibrated, maintained, tested, and operated in accordance with 40 CFR Part 60 Appendix B

"Performance Specifications" and Appendix F "Quality Assurance Procedures." The Permittee shall follow the monitoring requirements of 40 CFR § 60.47a.

**Recordkeeping/Reporting** [15A NCAC 2Q .0524]

iii.) The Permittee shall follow the recordkeeping and reporting requirements of 40 CFR § 60.49a.

e. 15A NCAC 2D .1400: NITROGEN OXIDES

Pursuant to 15A NCAC 2D .1417, the nitrogen oxide emissions from the coal fired boiler (ID No. E-2) shall not exceed the following:

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| nitrogen oxides | 142 tons beginning May 31, 2004 and ending September 30, 2004<br>178 tons beginning May 1, 2005 and ending September 30, 2005<br>167 tons beginning May 1, 2006 and ending September 30, 2006<br>167 tons beginning May 1, and ending September 30, for following years | 15A NCAC 2D .1400 |

**Compliance Schedules** - Pursuant to 15A NCAC 2D .1403(d), the Permittee shall:

i. on or before October 1, 2003, submit to the Director a description of how the source will comply, which shall include an estimate of the number of tons of nitrogen oxide per ozone season, which may be a range, that will be obtained from the nitrogen oxide budget trading program under Rule .1419 of this Section to show compliance; and

ii. install and implement any required monitoring, recordkeeping, and reporting requirements before May 1, 2004; if a permit application is necessary to install and operate the monitor, the permit application shall be submitted, by October 1, 2003; if a permit application is not submitted, the Director shall modify the source's permit by January 1, 2004 to insert the monitoring, recordkeeping, and reporting requirements necessary to show compliance with this Section.

**Monitoring/Recordkeeping** - Pursuant to 15A NCAC 2D .1404, the Permittee shall install, operate, and maintain a continuous emission monitoring system according to 40 CFR Part 75, Subpart H, with such exceptions as may be allowed under 40 CFR Part 75, Subpart H or 40 CFR Part 96. In addition, Pursuant to 2D .1404(h) the Permittee shall comply with recordkeeping and reporting requirements of 40 CFR Part 96, Budget Trading for State Implementation Plans.

**Reporting Requirements** - Pursuant to 15A NCAC 2D .1404(g), starting in 2004, the Permittee shall report to the Director no later than July 30 the tons nitrogen oxides emitted during the previous May and June. No later than October 30, the owner or operator shall report to the director the tons of nitrogen oxides emitted during the previous ozone season.

**C. One fuel oil-fired start-up boiler (ID No. E-2)**

1. Description

This boiler has not been used in 5 years. It was manufactured in 1994 and burns No. 2 fuel oil.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| particulate matter | 0.04 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| PM10 | 0.03 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| visible emissions | 20 percent opacity (six-minute average, except for one six-minute period per hour of not more than 27 percent opacity) | 15A NCAC 2D .0530 |
| sulfur dioxide | 0.31 pounds per million Btu heat input (30-day rolling average) | 15A NCAC 2D .0530 |
| nitrogen oxides | 0.13 pounds per million Btu heat input (30-day rolling average) | 15A NCAC 2D .0530 |
| carbon monoxide | 0.12 pounds per million Btu heat input (24-hour average) | 15A NCAC 2D .0530 |
| volatile organic pollutants | 0.041 pounds per million Btu heat input | 15A NCAC 2D .0530 |
| arsenic | $4.0 \times 10^{-6}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| beryllium | $2.5 \times 10^{-6}$ pounds per million Btu heat input | 15A NCAC 2D .0530 |
| particulate matter | 0.147 pound per million Btu heat input | 15A NCAC 2D .0503 |
| sulfur dioxide | fuel oil firing<br>0.5 percent sulfur content fuel oil | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Dc §60.43c** |

a. 2D .0530 "Prevention of Significant Deterioration"

i.) Regulation Analysis

This facility has undergone a PSD analysis in the past. Compliance has been demonstrated with the limits during the stack testing. Emissions from the combustion of No. 2 fuel oil are minimal.

ii.) Monitoring/Recordkeeping/Reporting Requirements

Several monitoring requirements were in the previous permit. Emissions shall be controlled by good combustion techniques and operating practices. Operation of this boiler shall not exceed nine hours during any one start-up period and 1041 hours of operation during any consecutive twelve month period. The

maximum sulfur content of any No. 2 fuel oil received and burned in the boiler shall not exceed 0.3 percent by weight. The maximum heat input shall not exceed 25 million Btu per hour. This boiler shall not be operated simultaneously when firing coal in the pulverized coal boilers (ID Nos. E-1 and E-15) for more than three hours per calendar month.

b. 2D .0503 "Particulates from Fuel Burning Indirect Heat Exchangers"

i.) Regulatory Analysis

This boiler is subject to 2D .0503 since coal is burned for the primary purpose of producing heat by indirect heat transfer. Allowable emissions of particulate matter from fuel combustion shall be calculated as follows:

$$E = 1.090 ( Q^{-0.2594}$$

where E = allowable particulate emission rate (pounds per million Btu), and
Q = maximum heat input rate (million Btu per hour)

The total maximum heat input of fuel firing indirect heat exchangers at this plant site (Q = 2285 million Btu per hour) established when these boilers came into operation is used to calculate the allowable emission limit, E = 0.147 pounds per million Btu heat input.

Compliance with this regulation is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

Since potential emissions are less than allowables, no monitoring, recordkeeping, or reporting is required.

c. 15A NCAC 2D .0524: NSPS 40 CFR Part 60, Subpart Dc

i.) Emission Limitations

This boiler was constructed after June 9, 1989 and so it is subject to this standard. Since it only combusts No. 2 fuel oil, it is subject to the emission limit for sulfur dioxide. The maximum sulfur content of any fuel oil received and burned in the boiler shall not exceed 0.5 percent by weight. Compliance is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring

Fuel oil certifications are required to ensure the sulfur content does not exceed the limit.

iii.) Recordkeeping/Reporting

Records shall be kept of the amounts of each fuel fired each day. Reports shall be submitted every six months of the fuel supplier certifications.

**D. Coal receiving, handling, and storage operations (ID Nos. ES-COAL1 and ES-COAL15), Lime receiving, storage, and recycling operations (ID Nos. ES-LIME1 and ES-LIME15), and Flyash/spent lime storage and handling operations (ID No. ES-FLYASH1)**

1. Description

This various equipment is used to receive, handle, and store coal, lime, and flyash/spent lime. It was manufactured in 1994.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| Regulated Pollutant | Limits/Standards | Applicable Regulation |
|---|---|---|
| particulate matter, PM10 | **ID Nos. E-7, E-8a, E-9, E-11, E-12, E-18, and E-22**<br>0.002 grains per standard cubic foot | 15A NCAC 2D .0530 |
| particulate matter, PM10 | **ID Nos. E-6, E-8b, and E-17**<br>0.02 grains per standard cubic foot | 15A NCAC 2D .0530 |
| particulate matter, PM10 | **ID No. E-3** - partially enclosed, chemical binder/water spray<br>**ID No. E-10** - enclosed building, enclosed conveyors<br>**ID Nos. E-4, E-16 and E-23** - enclosed building, enclosed conveyors, chemical binder/water spray<br>**ID No. E-5** - chemical binder/water spray<br>**ID No. E-24** - chemical binder<br>**ID No. E-9b** -enclosed moisture conditioning system, door flaps and flexible chute | 15A NCAC 2D .0530 |
| visible emissions | **ID Nos. E-3,E-4, E-5, E-6, E-7, E-8a, E-8b, E-9, E-9b, E-10, E-11, E-12, E-16, E-17, E-18, E-22, E-23, and E-24**<br>10 percent opacity | 15A NCAC 2D .0530 |
| visible emissions | **ID Nos. E-3, E-4, E-6, E-16, E-17, and E-23**<br>20 percent opacity | 15A NCAC 2D .0524<br>**40 CFR Part 60, Subpart Y** |

a. 2D .0530 "Prevention of Significant Deterioration"

i.) Regulation Analysis

This facility has undergone a PSD analysis in the past. Compliance has been demonstrated with the limits during the stack testing.

ii.) Monitoring/Recordkeeping/Reporting Requirements

Several monitoring requirements were in the previous permit. Fugitive dust emissions from the coal receiving, handling, and storage operations shall be controlled by enclosures and wet suppression with surfactant as necessary. Unloading of coal to the short-term storage pile shall be via a stacker tube. The coal crusher and pulverizers shall be enclosed (inside of building) to prevent fugitive dust emissions. Coal stockpiles shall be moistened or treated (wet suppression and surfactant) and the stockpile surfaces shall be kept moist or treated

at all times to minimize emissions during storage and handling. Fugitive dust emissions from the bottom ash and flyash/spent lime loadout operations shall be controlled by mixing the discharge with water.

In addition, the bagfilters will be inspected and maintained.

b. 15A NCAC 2D .0524: NSPS 40 CFR Part 60, Subpart Dc

i.) Emission Limitations

This equipment was constructed after October 24, 1974 and so it is subject to this standard. Visible emissions shall be less than 20 percent. Compliance is indicated by compliance with the stricter limit in 2D .0530.

ii.) Monitoring/Recordkeeping/Reporting Requirements

The monitoring, recordkeeping, and reporting requirements described above for regulation 2D .0530 will also ensure compliance with this regulation.

**E. One Storage Tank (ID No. T-01)**

1. Description

This is an above ground,fixed-roof tank used to store fuel oil. It was manufactured in 1994.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| **Regulated Pollutant** | **Limits/Standards** | **Applicable Regulation** |
|---|---|---|
| volatile organic compounds | recordkeeping only | 15 A NCAC 2D .0524 Subpart Kb |
| volatile organic compounds | atmospheric vent per API standard 650, 61.2 pounds per year | 15A NCAC 2D .0530 |

a. 2D .0524 "New Source Performance Standards (40 CFR 60 Subpart Kb"

i.) Regulation Analysis

Tank T-01 is subject to Kb because it is a storage vessel with a capacity greater than 40 cubic meters (10,566 gallons), was constructed, reconstructed or modified after July 23, 1984, and is used to store volatile organic liquids (VOL). The only requirement is that records of the dimension of the storage vessel and an analysis showing the capacity of the storage vessel shall be kept for the life of the vessel.

b. 2D .0530 “Prevention of Significant Deterioration”

i.) Regulation Analysis

This facility has undergone a PSD analysis in the past. Compliance has been demonstrated with the limits during the stack testing.

ii.) Monitoring/Recordkeeping/Reporting Requirements

Since potential emissions are less than allowables, no monitoring, recordkeeping, or reporting is required.

**F. One auxiliary generator engine (ID No. E-14)**

1. Description

This is an engine used approximately 96 hours per year to accommodate routine exercises, housekeeping and maintenance power, and unscheduled power outages. It was manufactured in 1994.

2. Applicable Regulatory Requirements

The following provides a summary of emission and/or operation limits for the emission source(s) described above. A review of the information in the application was performed to ensure the appropriate limits and associated calculations used to show compliance were correct.

| 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 |

a. 2D .0516 "Sulfur Dioxide Emissions from Combustion Sources"

i. Regulation Requirements

The generator is a source of emissions from combustion which discharge through a stack and therefore is subject to 2D .0516(a). Emissions of sulfur dioxide from this source shall not exceed 2.3 pounds per million Btu heat input.

Emissions of sulfur dioxide from the combustion of diesel are less than the emission limit.

ii. Monitoring/Recordkeeping/Reporting Requirements

The sulfur dioxide emissions from the combustion of diesel will always be less than the allowable emissions rate. For this reason monitoring and recordkeeping are not required for the combustion of diesel.

b. 2D .0521 "Control of Visible Emissions"

i. Regulatory Analysis

The generator was established before July 1, 1971 and therefore is subject to 2D .0521(d). Per this regulation, visible emissions shall not be more than 20 percent opacity when averaged over a six-minute period except that six-minute periods averaging not more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period.

ii. Monitoring/Recordkeeping/Reporting Requirements

The visible emissions from the combustion of diesel are minimal. For this reason monitoring and recordkeeping are not required for the combustion of diesel.

**VII. MACT Applicability and Requirements**

The facility may become subject to the future MACT standard for industrial boilers.

**VIII. Permit Shield (including non-applicable requirements)**

In accordance with 2Q .0512 the permit will contain a provision stating that compliance with the terms, conditions, and limitations of the Title V permit shall be deemed in compliance with applicable requirements specifically identified in the permit, as of the date of permit issuance. If the permit does not expressly state that a permit shield exists then it shall be presumed not to provide such a shield.

**IX. Insignificant Activities**

The insignificant activities listed in the application have been reviewed and verified.

Although each insignificant activity is not listed in the Title V permit, a general condition is placed in the Title V permit stating that all insignificant activities shall comply with the applicable requirements. Those sources which qualify for exemption from permitting under regulation NCAC 2Q .0503(8) will be attached to the cover letter of the permit.

**X. General Conditions**

The "General Conditions" section of the Title V Operating Permit lists additional applicable rule requirements that the permittee must adhere to, as with any other permit condition. These requirements in general are common to all Title V facilities. The general conditions include provisions such as annual fee payment, permit renewal and expiration, transfer of ownership or operation, property rights, submission of documents, inspections and entry procedures, reopen for cause, and severability.

**XI. Public Notice**

Pursuant to 15A NCAC 2Q .0521, a notice of the draft Title V Operating Permit shall be placed in a newspaper of general circulation in the area where the facility is located. The notice will provide for a 30 day comment period, with an opportunity for a public hearing. Copies of the public notice shall be sent to persons on the Title V mailing list, EPA, and Virginia.

**XII. Recommendations**

The initial Title V application for Roanoke Valley Project has been reviewed by the DAQ to determine compliance with all procedures and requirements under 15A NCAC 2Q .0500 and 40 CFR Part 70. The DAQ has made a preliminary determination that the facility is complying or will achieve compliance as specified in the draft permit with all applicable requirements. Therefore, the DAQ will propose to issue the Title V Operating Permit upon completion of the public comment period and the EPA review.