Title V Air Operation Permit Revision
Permit No. 1050004-029-AV

APPLICANT

The applicant for this project is Lakeland Electric. The applicant's responsible official and mailing address are: Mr. Thomas J. Trickey, P.E., Plant Manager, Lakeland Electric, C.D. McIntosh, Jr. Power Plant, 3030 E. Lake Parker Drive, Lakeland, Florida 33805.

FACILITY DESCRIPTION

The applicant operates the C.D. McIntosh, Jr. Power Plant, which is located in Polk County at 3030 E. Lake Parker Drive, Lakeland, Florida. This facility consists of three fossil fuel fired steam generators, two diesel powered generators, and two gas turbines. Fossil fuel fired steam generators 1 and 2 are fired with No. 6 fuel oil and natural gas, with distillate oil used as an igniter. Fossil fuel fired steam generator 3 is primarily fired with coal, refuse derived fuel and petroleum coke. Gas Turbine Peaking Unit 1 is primarily fired with natural gas, or No. 2 fuel oil with a maximum sulfur content of 0.5 percent by weight. McIntosh Unit 5, a 370 MW combined cycle stationary combustion turbine, is fired with natural gas, or No. 2 or superior grade fuel oil with a maximum sulfur content of 0.05 percent by weight. This facility also includes miscellaneous unregulated/insignificant emissions units and/or activities.

PROJECT DESCRIPTION

The purpose of this permitting project is to revise the Title V permit for the above referenced facility to incorporate the terms and conditions of Air Construction Permit Nos. 1050004-019-AC and 1050004-026-AC.

PROCESSING SCHEDULE AND RELATED DOCUMENTS

Renewed Title V Air Operation Permit effective date January 1, 2009.
Application to revise Title V permit received October 29, 2010.
Notice of Intent to Issue Air Permit issued January 24, 2011.
Public Notice Published February 10, 2011.

PRIMARY REGULATORY REQUIREMENTS

Title III: The facility is identified as a major source of hazardous air pollutants (HAP).

Title V: The facility is a Title V major source of air pollution in accordance with Chapter 62-213, Florida Administrative Code (F.A.C.).

PSD: The facility is a Prevention of Significant Deterioration (PSD)-major source of air pollution in accordance with Rule 62-212.400, F.A.C.

NSPS: The facility operates units subject to the New Source Performance Standards (NSPS) of 40 Code of Federal Regulations (CFR) 60.

NESHAP: The facility operates units subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

CAIR: The facility is subject to the Clean Air Interstate Rule (CAIR) set forth in Rule 62-296.470, F.A.C.

Siting: Unit 3 was originally certified pursuant to the power plant siting provisions of Chapter 62-17, F.A.C.

CAM: Compliance Assurance Monitoring (CAM) applies to emission unit 3 for the control of particulate matter (PM). Unit 3 uses an electrostatic precipitator (ESP) to control PM emissions. The other emissions units at the facility are not subject to CAM for one or more of the following reasons: they do not trigger the pre-air pollution control device major source emission thresholds; they demonstrate continuous compliance with a continuous emission monitoring system (CEMS); or, they are not equipped with air pollution control devices.

PROJECT REVIEW

The purpose of this Title V Permit Revision is to incorporate the provisions of the Air Construction Permit Nos. 1050004-019-AC and 1050004-026-AV into the current Title V air operation permit. The construction permits authorized the construction of a selective catalytic reduction (SCR) system to reduce NO_X emissions and a sorbent injection system to reduce sulfuric acid mist (SAM) emissions. The changes being made to the permit are shown below. Additions are shown in double underline format and deletions are shown in ~~strike through~~ format. For ease of locating, the changes are also highlighted within the draft permit.

1. **E.15** and **E.16** are being deleted and replaced with the condition below.

~~**E.15.** Carbon Monoxide (CO).~~

~~a. Emissions of CO shall not exceed 0.20 lb/mmBtu heat input on a 30-operating day rolling average as demonstrated by the required CEMS. This CO emission limit may be adjusted downward to make this limit more stringent based on the Department's reassessment of BACT during the subsequent phase of this project involving installation of selective catalytic reduction.~~

~~b. Emissions of CO shall not exceed 0.20 lb/mmBtu on a 3-hr average during the initial compliance demonstration.~~

~~[Rules 62-210.200(BACT) and 62-212.400(PSD), F.A.C.; and, PSD-FL-387.]~~

~~**E.16.** Emissions Limits Subject to Revision. Emissions of CO from Unit 3 shall not exceed the limitations specified in this permit. Based on results of compliance tests and continuous monitoring data, the Department will reassess the BACT determination in conjunction with the subsequent phase of the project which will include installation of selective catalytic reduction. The emission limit may be adjusted downward to make this limit more stringent provided that overall control attained for all air pollutants including CO, SO_2, NO_X, PM/PM_{10}, sulfuric acid mist and VOC is optimized. Such revision shall be based on data that represents a full range of operating conditions and a representative period of time. Such revision, if required by the Department, shall be in the form of a federally enforceable permit and shall be publicly noticed by the permittee. [Rules 62-4.070(3), 62-210.200(BACT) and 62-212.400(PSD), and 62-212.400(7)(a), F.A.C.; and, and, PSD-FL-387.]~~

E.16. CO Emission Limit Subject to Revision. Emissions of carbon monoxide (CO) from Unit 3 shall not exceed 0.20 pounds per million Btu heat input (lb/MMBtu) on a 30-day rolling average as described in air construction permit 1050004-018-AC. Based on results of compliance tests and analysis of 12 months worth of continuous monitoring data, the Department will reassess the previously issued best available control technology (BACT) determination. The emission limit may be adjusted downward to make this limit more stringent provided that overall control attained for all air pollutants including CO, SO_2, NO_X, PM/PM_{10}, sulfuric acid mist, and VOC is optimized. Such revision shall be based on data that represents a full range of operating conditions and a representative period of time. Such revision, if required by the Department, shall be in the form of an air construction permit following the Department's procedures in Rules 62-210.300 and 62-4.055, F.A.C. [Air Construction Permit Nos. 1050004-019-AC, Specific Condition 13.a and 1050004-026-AC, Specific Condition 13.]

2. The conditions below are being added from the provisions established in the Air Construction permits 1050004-019-AC and 105004-026-AC.

E.15. Ammonia Emissions (Slip). Subject to the requirements of Condition 36 in this section, the SCR system shall be operated for an ammonia slip target of less than 5 ppmv based on the average of three, 1-hour test runs. [Air Construction Permit No. 1050004-026-AC, Specific Condition 12.]

E.17. NO_X Emission Limit. NO_X emissions from Unit 3 shall not exceed 0.22 lb/MMBtu of heat input based on a calendar year average of all periods of operation, including startup, shutdown and malfunction. The permittee shall begin collecting and averaging data towards a demonstration of compliance with the new NO_X

emissions limitation beginning January 1, 2011. [Air Construction Permit No. 1050004-026-AC, Specific Condition 13.b.]

E.26. Ammonia Monitoring Requirements. In accordance with the manufacturer's specifications, the permittee shall calibrate, operate, and maintain an ammonia flow meter to measure and record the ammonia injection rate to the SCR system. [Air Construction Permit No. 1050004-019-AC, Specific Condition 22.]

E.34. Determining Actual SAM Emissions. The permittee must demonstrate on an annual basis, for a period of 5 years from the date of the maximum sulfur content tested, that SAM emissions increases as a result of this project are less than 7 TPY. The permittee shall operate the sorbent injection system at a frequency and injection rate for SAM control to satisfy this requirement. An automated control system will be used to adjust the sorbent flow rate for the given set of operating conditions based on the most recent performance test results. Actual SAM emissions shall be calculated using the information available for the given operating conditions (e.g., the sulfur content of fuel blend, the SO_2 emission rate prior to the SCR catalyst, the unit load, the flue gas flow rate, the sorbent injection rate and the current catalyst oxidation rate). If performance testing shows that it is unnecessary to operate the sorbent injection system for a given coal blend or the sorbent injection system is removed, the permittee shall determine actual SAM emissions based on emissions factors developed through the performance tests. [Air Construction Permit No. 1050004-026-AC, Specific Condition 16 and Rule 62-212.300(1)(e), F.A.C.]

E.35. SAM Performance Tests and Sorbent Injection for SAM Emissions Control. The permittee conducted stack tests to determine the uncontrolled sulfuric acid mist emission rate, the controlled sulfuric acid mist emission rate, and actual control efficiency of the installed sorbent injection system. Tests were conducted while firing the fuel blend with the highest sulfur content that will be fired in the unit. During each test run, the permittee continuously monitored and recorded the sorbent injection rate. The purpose of these tests were to determine actual control efficiency of the installed systems and to establish the correlation between SAM emissions and the sorbent injection rate, which will be used to calculate the actual annual emissions. If the permittee desires to alter the injection rate of the system that has been previously determined (due to lower sulfur coal being burned, to turn off the system, or any other situation the permittee feels the system can be adjusted for), then the following tests shall be conducted. Within 45 days of firing a fuel blend with a sulfur content that is 0.20% sulfur by weight (based on a 14-operational day rolling average) higher than the maximum sulfur content previously tested or if the permittee desires a new injection rate, then the permittee shall conduct the following additional SAM performance tests.

a. Conduct the SAM performance tests in accordance with the following requirements, or
   (1) For each set of operating conditions being evaluated, the permittee shall conduct at least a 1-hour test run to determine SAM emissions. At least nine such test runs shall be conducted to evaluate the effect on SAM emissions from such parameters as the SO_2 emission rate prior to the SCR catalyst (and FGD system), the unit load, the flue gas flow rate, the sorbent injection rate and the current catalyst oxidation rate.
   (2) Tests shall be conducted under a variety of fuel blends and load rates that are representative of the actual operating conditions. Sufficient tests shall be conducted to establish the SAM emissions rates for the following scenarios: SCR reactor in service (ammonia injection) without sorbent injection, and SCR reactor in service (ammonia injection) under varying operating conditions and levels of sorbent injection.
   (3) At least 15 days prior to initiating the performance tests, the permittee shall submit a test notification, preliminary test schedule and test protocol to the Bureau of Air Regulation and the Compliance Authority.
   (4) Within 45 days following the last test run conducted, the permittee shall provide a report summarizing the emissions tests and results. All SAM emissions test data shall be provided with this report.
   (5) Within 45 days following the submittal of the emissions test report and no later than 90 days following the last test run conducted, the permittee shall submit a project report summarizing the following:

(a) Identify each set of operating conditions evaluated;
(b) Identify each operating parameter evaluated;
(c) Identify the relative influence of each operating parameter, describe how the automated control system will adjust the sorbent injection rate based on the selected parameters;
(d) Identify the frequency with which operational parameters will be reevaluated and adjusted within the automated control system;
(e) Provide the algorithm used for the automated control system or a series of related performance curves; and
(f) Provide details for calculating and estimating the SAM emissions rate based on the level of sorbent injection and operating conditions. The test results shall be used to adjust the sorbent injection control system and estimate SAM emissions.

b. If the sorbent injection system is removed or is determined to be unnecessary for a given coal blend, conduct at least three, 1-hour test runs at permitted capacity to determine the SAM emissions rate.

The permittee shall use the data collected to calculate the actual SAM emissions when operating under the given conditions, including the period of time from first fire of the fuel blend until the performance test results are known. [Air Construction Permit No. 1050004-026-AC, Specific Condition 15.]

E.36. Ammonia Slip Tests. Annual compliance with the ammonia (NH_3) slip target shall be determined using EPA conditional test method (CTM-027), EPA method 320, or other methods approved by the Department. If the tested ammonia slip rate exceeds 5 ppmv during the test, the permittee shall:

a. Begin testing and reporting the ammonia slip for each subsequent calendar quarter;
b. Before the ammonia slip exceeds 7 ppmv, take corrective actions that result in lowering the ammonia slip to less than 5 ppmv; and
c. Test and demonstrate that the ammonia slip is less than 5 ppmv within 30 days after completing the corrective actions.

Corrective actions may include, but are not limited to, adding catalyst, replacing catalyst, or other SCR system maintenance or repair. After demonstrating that the ammonia slip level is less than 5 ppmv, testing and reporting shall resume on an annual basis. [Air Construction Permit No. 1050004-026-AC, Specific Condition 18.]

E.45. Future Actual Emissions Reporting. The permittee shall maintain and submit to the Department on an annual basis for a period of 5 years from the date the SCR systems are initially operated, information demonstrating in accordance with Rule 62-212.300(1)(e), F.A.C., using the emissions computation and reporting procedures in Rule 62-210.370, F.A.C., that the installation of LNB, OFA and SCR did not result in an emissions increase of PM or SAM that would equal or exceed the respective significant emission rates as defined in Rule 62-210.300, F.A.C. The future emissions shall be compared with the baseline actual emissions for the period 2001-2002 for SAM and 2002-2003 for PM as reported in the annual operating reports (AOR) using EPA Method 5B for PM and Method 8A (controlled condensate) for SAM. [Air Construction Permit No. 1050004-019-AC, Specific Condition 14.]

E.46. New Control Equipment. In accordance with Rule 62-210.300(1)(a), F.A.C., if the sorbent injection system is removed, the permittee shall obtain an air construction permit to install new acid mist mitigation equipment or to reinstall the sorbent injection system if required to maintain SAM emissions below a 7 TPY increase above the baseline emissions, which were estimated at 136 TPY. [Air Construction Permit No. 1050004-026-AC]

3. Condition **E.38.** is an obsolete condition and will be deleted from the permit.

~~**E.38.** Reporting of Future Increases. The City shall maintain and submit to the Department on an annual basis for a period of five years from the date that the unit is initially co-fired with petroleum coke, information demonstrating in accordance with 40 CFR 52.21(b)(33) and 40 CFR 52.21(b)(21)(v) that the operational changes did not result in emissions increases of carbon monoxide, nitrogen oxides, or sulfuric acid mist. [PSD-FL-008(B)]~~

4. The following administrative changes were made at the request of the applicant as a part of this revision.

- **Subsection A. Facility Description** was changed to read as following per applicant requests during the revision process. This change was made to more accurately describe the facility based on the current operating permit.

  This facility consists of three fossil fuel fired steam generators, two diesel powered generators, and two gas turbines. Fossil fuel fired steam generator Unit 1 is fired with natural gas, No. 6 fuel oil or on-specification used oil generated by the City of Lakeland. Fossil fuel fired steam generator Unit 2 is fired with natural gas, propane, No. 2 fuel oil or No. 6 fuel oil. Fossil fuel fired steam generator 3 is ~~primarily~~ fired with coal, refuse derived fuel, natural gas and petroleum coke. Gas Turbine Peaking Unit 1 is primarily fired with natural gas, or No. 2 fuel oil with a maximum sulfur content of 0.5 percent by weight. McIntosh Unit 5, a 370 MW combined cycle stationary combustion turbine, is fired with natural gas, or No. 2 or superior grade fuel oil with a maximum sulfur content of 0.05 percent by weight. Also included in this permit are miscellaneous unregulated/insignificant emissions units and/or activities.

- **Section III Subsection D Specific Condition 14.** The applicant requested that the Department look into the sulfur dioxide (SO_2) testing required for each federal fiscal year. The Department discovered that compliance with the liquid fuel SO_2 limit contained in Specific Condition D.7. is demonstrated by fuel sampling and analysis as specified in Specific Condition D.17. Therefore, the requirement to perform stack tests to demonstrate compliance with the SO_2 limit are not appropriate and have been deleted from this condition.

  D.14. Annual Compliance Tests. Unless otherwise specified by this permit, during each federal fiscal year (October 1st to September 30th), this emissions unit shall be tested to demonstrate compliance with the emission limitations and standards for particulate matter, nitrogen oxides, ~~sulfur dioxide,~~ and visible emissions. The NO_X ~~and SO_2~~ RATA test data may be used to demonstrate compliance with the annual test requirement, provided the testing requirements (notification, procedures & reporting) of Chapter 62-297, F.A.C. are met. [Rule 62-297.310(7), F.A.C.]

5. Permit condition numbers were adjusted accordingly based on the addition and deletion of conditions.

6. Appendix TV is being updated for administrative changes.

CONCLUSION

This project revises Title V air operation permit No. 1050004-023-AV, which was effective on January 1, 2009. This revision is issued under the provisions of Chapter 403, Florida Statues (F.S.), and Chapters 62-4, 62-210 and 62-213, F.A.C.