

217/782-2113

CONSTRUCTION PERMIT

PERMITTEE

Waukegan Generating Station
c/o Midwest Generation, LLC
Attn: Scott B. Miller
235 Remington Boulevard, Suite A
Bolingbrook, Illinois 60440

Application No.: 10090034

I.D. No.: 097190AAC

Applicant's Designation:

Date Received: September 16, 2010

Subject: Dry Sorbent Injection System and ESP Conversion for Unit 7

Date Issued: November 19, 2010

Location: Waukegan Station, 401 East Greenwood Avenue, Waukegan, Lake County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a dry sorbent injection system and electrostatic precipitator conversion for Waukegan Unit 7, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special conditions:

Conditions for the Project

1.1 Introduction

- a.
 - i. This permit authorizes construction of a dry sorbent injection system (the affected system) on the boiler for Waukegan Unit 7 (the affected boiler). This system would be designed to inject Trona (a mineral form of sodium carbonate and sodium bicarbonate) into the duct work at a point prior to the electrostatic precipitator (ESP) of the affected boiler to control the sulfur dioxide (SO₂) emissions of the boiler.
 - ii. This permit also authorizes conversion of the existing ESP to a "cold-side" design, with the ESP being downstream of the air heater. This change will improve the control efficiency of the ESP which controls particulate matter (PM) emissions from affected boiler. This is because the reduction in the temperature of the flue gas through the air heater will decrease the actual gas volume, thereby increasing the gas residence time in the ESP. In addition, injection of sodium based dry sorbents, as planned may reduce resistivity of the fly ash resulting in improved ESP collection efficiency. It will also improve the effectiveness of control of mercury emissions by the activated carbon injection system on the affected boiler.

- iii. This permit also authorizes relocation of the injection points for the activated carbon injection (ACI) system on the affected boiler, which was installed for control of mercury emissions pursuant to Construction Permit 07050007.
 - iv. This permit also authorizes construction of a material handling facility to receive, store, and handle sorbent materials for the affected system, including new bulk storage silos and associated fabric filters.
- b. This permit does not authorize any modifications to existing Waukegan Unit 7, which would increase its capacity or emissions.

1.2 Non-Applicability Provisions

- a. i. This permit is issued based on this project, being an emission control project that will reduce emissions of SO₂ from the affected boiler and will not cause emissions increase of any other NSR regulated pollutant. In particular, the construction of the affected system and ESP conversion are being undertaken to meet the requirement of the Combined Pollutants Standards (CPS), 35 IAC 225.296(a)(1) and (c)(1).
 - ii. This permit is issued based on the new material handling facility associated with the affected system, the increase in throughput of the existing fly ash handling facility and the increase in road traffic from handling sorbent and additional ash, as constrained by the limitations and requirements in this permit, not being a major modification for purposes of the federal PSD rules (40 CFR 52.21), the Federal Emission Offset Interpretive Ruling (40 CFR Part 51, Appendix S) and Illinois' MSSCAM rules (35 IAC Part 203). This is because the increases in emissions of individual pollutants from these units are less than the significant emission rates set in these rules.
- b. The Illinois EPA has determined that the changes to the affected boiler, as described in the application, will not constitute a modification of the boiler under the federal New Source Performance Standards, 40 CFR 60 because the changes have the primary function of reducing emissions and therefore are not considered a modification pursuant to 40 CFR 60.14(e)(5).

1.3 Existing Applicable Requirements

This permit does not relax or revise applicable requirements for Waukegan Unit 7 and associated control equipment, including requirements in existing permits for the source, including provisions for continuous opacity monitoring systems, startup, malfunction and breakdown, recordkeeping, and reporting.

1.4 Future Applicable Emission Standards under the Combined Pollutant Standards (CPS)

- a. As provided by 35 IAC 225.296, beginning December 31, 2013, the Permittee shall not operate the affected boiler until the affected system is installed and the ESP conversion is completed.
- b. Beginning calendar year 2013, the CPS group annual average SO₂ emission rate of the specified EGUs (at Fisk, Crawford, Joliet, Powerton, Waukegan and/or Will County power plants) including the affected boiler shall not exceed the applicable limit in 35 IAC 225.295(b).

1.5. Control Practices

- a. The affected system shall be designed to achieve to 90 percent removal of sulfur dioxide (SO₂) in the flue gas.
- b. At all times, the Permittee shall maintain and operate affected boiler with the affected system and cold-side ESP in a manner consistent with good air pollution control practices.

1.6 Emission Testing Requirements

- a.
 - i. Within one year after initial startup of the affected boiler with the affected system and cold-side ESP or by June 30, 2014, whichever occurs first, the particulate matter emissions of the boiler shall be measured by an approved testing service.
 - ii. These tests shall be followed by two more tests for particulate matter, which shall be conducted no less than 5 months and no more than 15 months from the previous test.
- b. These tests shall be conducted during conditions that are representative of highest injection rates for sorbent and activated carbon at full load as follows.
- c. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Agency: Refer to 40 CFR 60, Appendix A and 40 CFR 61, Appendix B and 40 CFR Part 51, Appendix M for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow & Velocity	USEPA Method 2
Particulate Matter (PM)	USEPA Methods 5 & 202*

* Measurements of condensable PM are also required by USEPA Method 202 (40 CFR Part 51, Appendix M) or other established test method approved by the Illinois EPA.

- d. The test plan shall be submitted to the Illinois EPA for review at least 60 days prior to the actual date of testing. This plan shall describe the specific procedures for testing and shall, at a minimum, include the following information:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - ii. The specific conditions, e.g., operating rate and control device operating conditions, under which testing shall be performed including a discussion of why these conditions will be representative and the means by which the operating parameters will be determined.
 - iii. The specific determinations of emissions that are intended to be made, including sampling or monitoring locations. As part of this plan, the Permittee may set forth a strategy for also performing emission testing in the normal load range of the boiler.
 - iv. The test method(s) that will be used, with the specific analysis method if the method can be used with different analysis methods.
- e. Prior to carrying out these tests, the Illinois EPA's Regional Office and Source Emission Test Specialist shall be notified a minimum of 30 days prior to the expected date of these tests and further notified a minimum of 5 working days prior to the tests of the exact date, time and place of these tests, to enable the Agency to witness these tests.
- f. Three copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA within 14 days after the test results are compiled and finalized. The following information shall be submitted with the results:
 - i. The gross power generation and the steam generation rate, including the key operating data for the Unit 7 during the test.
 - ii. Significant operating parameters of the affected system and ESP and the existing ACI system, such as location and injection rate of each dry sorbent material during the period of testing, as measured during the tests.
 - iii. Flue gas temperature before the ESP and other significant operating parameters of the ESP, such as ESP voltage and current flows, and spark rates during the period of testing, as measured during the tests

- iv. SO₂ emission data during the periods of testing based on emission monitoring, and the calculated SO₂ control efficiency on a daily basis.
- v. Opacity data collected by the continuous opacity monitoring systems during each test run, on a minute-by-minute basis, and if conditions are suitable for such observation, observations of opacity at the stack (two 6-minute averages) for each test run.

1.7 Monitoring and Instrumentation Requirements

- a. The Permittee shall install, operate and maintain instrumentation for sorbent injection rate, by volume or mass, which may either be measured directly or by indirectly, e.g., by measuring feeder speed.
- b. The Permittee shall install, operate and maintain instrumentation to measure the temperature of the flue gas entering the cold side ESP or air heater outlet.
- c. This permit does not authorize changes to the existing monitoring systems or instrumentation which already exist on the ESP when converted to a cold-side design.

1.8 Recordkeeping Requirements

- a. The Permittee shall keep a file that contains documentation for the design of the affected system confirming compliance with Condition 1.5(a).
- b. The Permittee shall maintain the following records for the cold-side ESP:
 - i. A maintenance and repair log for the ESP, which shall list the activities performed, with date and description.
 - ii. An operating log, including:
 - A. The status of each ESP field shall be recorded at least once per shift.
 - B. The following numerical data shall be recorded at least once per day: (1) Primary voltages and current flows, (2) Secondary voltages and current flows, and (3) Sparking rates.
- c. All records required by this permit shall be retained at a readily accessible location at the source for at least three years from the date of entry and shall be made available for inspection and copying by the Illinois EPA upon request. Any records retained in an electronic format (e.g., computer) shall

be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.

1.9 Notifications

- a. The Permittee shall notify the Illinois EPA in writing within 21 days of the initial startup of the affected system.
- b. The Permittee shall notify the Illinois EPA in advance of using a sorbent other than Trona in the affected system. This notification shall be submitted at least three months in advance if possible or otherwise promptly after the Permittee learns that an alternative sorbent will need to be used. This notification shall identify the alternative sorbent and include an explanation of the reason for use of an alternate sorbent, the expected duration for use of the alternative sorbent (if temporary), and the expected changes in sorbent injection rates.

1.10 Reporting Requirements

- a. If there is a deviation from the requirements of this permit, the Permittee shall promptly submit a report of the deviation to the Illinois EPA. Unless otherwise specified, this report shall be submitted within 30 days of the deviation. The report shall describe the deviation, the probable cause of the deviation, corrective actions that were taken and any actions to prevent future occurrences.

1.11 Report/Notifications Submittals

Two copies of all notifications and reports required by the Permit shall be sent to:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276

Telephone: 217/782-5811 Fax: 217/782-6348

and one copy of all required notifications and reports shall be sent to the Illinois EPA's regional office at the following address, unless otherwise indicated:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Regional Field Office
9511 West Harrison
Des Plaines, Illinois 60016

Telephone: 847/294-4000 Fax: 847/294-4018

1.12 Authorization for Operation

- a. The affected boiler with affected system and cold-side ESP may be operated for one year under this construction permit, during which period initial emissions testing shall be completed and the Permittee shall apply for a revised CAAPP permit addressing the changes to the control system for the affected boiler, which application shall include a compliance assurance monitoring (CAM) plan for the affected boiler for emissions of particulate matter.
- b. Following completion of required emission testing, the Permittee may operate the affected boiler with affected system and cold-side ESP under this permit until the operation of this control equipment is addressed by a CAAPP permit.
- c. These conditions supersede Standard Condition 6.

Unit-Specific Conditions for the Material Handling Facilities

2.1 Introduction

The affected facilities for the purpose of these Unit-Specific Conditions are the new facility for handling dry sorbent and the existing facilities for handling fly ash, which would handle additional materials.

2.2 Applicable Federal Emission Standards

- a. The mills, storage silos and conveying system at the affected sorbent handling facility are subject to the NSPS for Nonmetallic Mineral Processing Plants, 40 CFR 60, Subpart 000 and related provisions of 40 CFR 60, Subpart A.
- b. Pursuant to the NSPS, 40 CFR 60.672(b) and (d), fugitive emissions of PM from subject units shall not exceed 7 percent.
- c. Pursuant to the NSPS, 40 CFR 60.672(f), stack emissions of PM, as defined by 40 CFR 60.671, from the subject units shall not exceed 7 percent
- d. At all times, the Permittee shall maintain and operate subject units, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions, pursuant to 40 CFR 60.11(d).

Note: These conditions would not apply if mills or grinding equipment are not present at the affected facility. See Condition 2.4(a).

2.3 Applicable State Emission Standards

- a. The affected facilities are subject to 35 IAC 212.301, which provides that no person shall cause or allow the emission of fugitive particulate matter from any emission unit, that is visible by an observer looking generally toward the zenith (that is looking at the sky directly overhead) from a point beyond the property line of the source pursuant to 35 IAC 212.301.
- b. The emission units at the affected facilities are subject to 35 IAC 212.123 (a) which provides that no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent into the atmosphere from the affected facility, pursuant to 35 IAC 212.123(a).
- c. The emission units at the affected facilities are subject to 35 IAC 212.321(a), which provides that no person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit which, either alone or in combination with the emission of particulate matter from all other new similar process emission units at a source or premises, exceeds the allowable emission rates specified in 35 IAC 212.321(c).

2.4 Non-Applicability Provisions

- a. If the affected sorbent handling facility does not include mills or grinding equipment, which would reduce the size of sorbent, this permit is issued based on this facility not being subject to the federal NSPS, 40 CFR 60 Subpart 000, because it would not crush or grind a non-metallic mineral so that it would not constitute a nonmetallic mineral processing plant, as defined by 40 CFR 60.671. Accordingly, the requirements of Conditions 2.2, 2.7(a) and 2.9(a) would not be applicable.

2.5 Operational Limitations

- a. The amount of dry sorbent received by the affected sorbent handling facility shall not exceed 90,000 tons per year. Compliance with this limit shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 months total).
- b.
 - i.
 - A. There shall be no visible emissions of fugitive particulate from the affected sorbent handling facility.
 - B. The filters for the affected sorbent handling facility shall have a design outlet loading for particulate matter of no more than 0.01 grains/scf, as shown by the manufacturer's performance

specifications for the device or representative emission test data for similar filter devices.

- ii. A. Emissions of PM from the affected facility shall each not exceed 1.95 tons per year.
- B. This permit is issued based upon minimal emissions of PM due to vehicle traffic on plant roadways associated with transport of sorbent. For this purpose, PM emissions shall not exceed 1.1 tons per year.
- c. The transport of dry sorbent and fly ash from the affected boiler shall be on paved roads, which shall be maintained in good condition to control emissions of particulate matter.
- d. i. This permit is issued based on a negligible increase in PM emissions from the affected fly ash facility. For this purpose, the increase in PM emissions shall not exceed 0.1 pound per hour and 0.44 tons per year.
- ii. This permit is issued based upon a minimal increase in emissions of PM due to the increase in vehicle traffic on plant roads for fly ash. For this purpose, the increase in PM emissions shall not exceed 1.1 tons per year.
- a. At all times, the Permittee shall maintain and operate the emission units at affected facilities including associated air pollution control measures, in a manner consistent with good air pollution control practices for minimizing emissions.

2.6 Inspection and Maintenance Requirements

- a. Inspections of the dry sorbent and fly ash handling facilities including emission control measures shall be conducted at least once per month when the facility is in operation to confirm compliance with the requirements of this permit.
- b. Maintenance and repair of filters, and other control measures shall be performed to assure that such measures function properly when material is being handled.
- c. The Permittee shall maintain records of the above inspections and maintenance/repair activity in an operating and maintenance log. This log shall contain, at a minimum, the time and description of the inspections or maintenance/repair activities.

2.7 Opacity Measurements

- a. For the affected sorbent handling facility, the Permittee shall comply with applicable requirements of the NSPS related to observation of opacity.

- b. Upon written request by the Illinois EPA, the Permittee shall conduct opacity observations for specific operation(s) or unit(s) at the affected facility within 45 calendar days of the request or on the date agreed upon by the Illinois EPA, whichever is later.

2.8 Recordkeeping Requirements

- a. The Permittee shall maintain a file containing documentation for the emission guarantee for each filter in the affected sorbent handling facility, in grains/dscf, as provided by the supplier of the device.
- b. The Permittee shall maintain operating records for the following items:
 - i. Amount of dry sorbent received, tons/month and tons/year.
 - ii. Amount of dry sorbent transferred to the affected system, tons/month and tons/year.
- c. The Permittee shall keep records for the implementation of fugitive dust control measures on roadways used by trucks that handle dry sorbent and fly ash.
- d. The Permittee shall keep the following records related to PM emissions (tons/month and tons/year), with supporting calculations. For this purpose, roadway emissions shall be calculated using USEPA methods.
 - i. Records of emissions of PM and PM10 from the affected facility.
 - ii. Records of emissions of PM and PM10 from roadways/truck traffic associated with the affected facility.
 - iii. Records of PM and PM10 emissions from roadways/truck traffic associated with handling of fly ash from the affected boiler

2.9 Reporting Requirements

- a. The Permittee shall either comply with applicable reporting requirements of the NSPS unless crushing or grinding equipment will not be installed at the facility, in which case the Permittee shall notify the Illinois EPA of this decision.

Note: Reporting of deviation is addressed by Condition 1.10(a).

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2.10 The affected facilities may be operated pursuant to this construction permit until an operating permit becomes effective that addresses these facilities. This condition supersedes Standard Condition 6.

If you have any questions on this permit, please contact Shashi Shah at 217/782-2113.

Edwin C. Bakowski, P.E.
Manager, Permit Section
Division of Air Pollution Control

Date Signed: _____

ECB:SRS:psj

cc: FOS - Region 1, Illinois EPA
Permit File - 95090047