

CONSTRUCTION PERMIT - NSPS SOURCE

PERMITTEE

University of Illinois at Chicago
Attn: Heather Jackson, Assistant Director of Chemical Safety and
Environmental Compliance
1129 South Hermitage (MC 645)
Chicago, Illinois 60612

Application No.: 13080001

I.D. No.: 031600CRS

Applicant's Designation:

Date Received: August 2, 2013

Construction of: New Natural Gas Fired Boiler (Boiler #7)

Date Issued: DRAFT

Location: UIC-West Campus, 1717 West Taylor Street, Chicago, Cook County, 60612

This Permit is hereby granted to the above-designated Permittee to CONSTRUCT emissions source(s) and/or air pollution control equipment consisting of a natural gas-fired boiler, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1. Introduction

The project involves installation of a natural gas-fired boiler, Boiler #7 (the affected boiler) at the West Campus. The boiler will fire natural gas as its primary fuel and distillate oil for backup. The new boiler is planned as a replacement for an existing natural gas fired boiler (existing Boiler #7) that is near the end of its useful life.

2-1. Applicable Federal Emission Standards

- a. i. The affected boiler is subject to the federal New Source Performance Standards (NSPS) for Industrial-Commercial-Institutional Steam Generating Units, 40 CFR 60 Subpart Db (Boiler NSPS), and related requirements of the General Provisions of the NSPS, 40 CFR 60 Subpart A.
- ii. Pursuant to the NSPS, 40 CFR 60.44b(i) and (1)(1), as a high heat release rate boiler, the NO_x emissions of the affected boiler shall not exceed 86 ng/J (0.20 lb/million Btu) heat input on a 30-day rolling average basis, beginning on and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8, whichever date comes first.

Note: NO_x emissions of the boiler are subject to a more stringent limit, 0.061 lb/mmBtu, on a 30-day rolling average basis. (See Condition 5(a).)

- b. Pursuant to 40 CFR 60.43b(f), while firing distillate oil, the emissions of smoke or other particulate matter from the affected boiler shall not have an opacity greater than 30 percent, except as provided in 35 IAC 212.123(b).

2-2. Applicable State Emission Standards

- a. Pursuant to 35 IAC 212.123(a), the emissions of smoke or other particulate matter from the affected boiler shall not have an opacity greater than 30 percent, except as provided in 35 IAC 212.123(b).
- b. When the affected boiler is fired on distillate oil, it is subject to 35 IAC 212.206, which provide that the emissions of particulate matter (PM) from the boiler due to firing of oil shall not exceed 0.15 kg of PM per MW-hr of actual heat input (0.10 lb/mmBtu).
- c. When the affected boiler is fired on distillate oil, it is subject to 35 IAC 214.122(b)(2), which provide that the emissions of sulfur dioxide (SO₂) from the boiler due to firing of oil shall not exceed 0.46 kg of SO₂ per MW-hr of actual heat input (0.3 lb/mmBtu).

Note: This emission standard requires the sulfur content of the oil fired in the boiler to not exceed 0.15 pound/mmBtu.

- d. Pursuant to 35 IAC 216.121, the emission of CO from the affected boiler shall not exceed 200 ppm, corrected to 50 percent excess air.
- e. Effective January 1, 2015, pursuant to 35 IAC 217.152(a), the affected boiler will become subject to the control requirements of 35 IAC 217 Subparts D and E, which establish requirements that reflect Reasonably Available Control Technology for boilers related to emissions of NO_x.

Note: The limit in 35 IAC Part 217 Subpart E, which applies on an ozone season and an annual basis, is less stringent than the emission limit for NO_x set for the affected boiler in Condition 5.

3. Non-Applicability Provisions

- a. This permit is issued based on this project not being a major project for purposes of state rules for Major Stationary Sources Construction and Modification (MSSCAM), 35 IAC Part 203, and the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21, because the emissions of various pollutants will not be significant. In particular, the permitted emissions of the affected boiler are less than 40 tons/year for NO_x, 100 tons/year for CO and 75,000 tons/year for GHG, as CO₂e.
- b. This permit is issued based on the affected boiler not being subject to the SO₂ emission standards and SO₂ continuous emissions monitoring system requirements of the NSPS, 40 CFR 60.42b and 60.47b(a). This is because very low sulfur oil (as defined in 40 CFR 60.41b) and gaseous fuel is being fired in the boiler so these requirements do not apply pursuant to 40 CFR 42b(k)(2) and 60.47b(f).

- c. This permit is issued based on the affected boiler not being subject to the PM emission standard of the NSPS, 40 CFR 60.43b(h)(1). This is because the fuel oil combusted in the boiler will contain less than 0.3 percent sulfur by weight so this standard does not apply pursuant to 40 CFR 43b(h)(5).
- d. This permit is issued based on the affected boiler not being subject to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers at Area Sources, 40 CFR 63, Subpart JJJJJJ. This is because the affected boiler meets definition of a gas fired boiler at 40 CFR 63.11237 and, pursuant to 40 CFR 63.11195(e), gas fired boilers are not subject to the requirements of this NESHAP.
- e. This permit is issued based on the affected boiler not being subject to the requirements of 35 IAC 217 Subpart U, pursuant to 35 IAC 217.454(a). This is because maximum design heat input of the boiler is less than 250 mmBtu/hr.

4. Operational Limits

- a.
 - i. Natural gas and distillate fuel oil shall be the only fuels fired in the affected boiler.
 - ii. The affected boiler shall be operated so as to qualify as a "gas fired boiler" as defined in 40 CFR 63.11237. That is, the boiler shall only burn gaseous fuels not combined with any solid fuels and burn liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year.
- b. The design heat input of the affected boiler shall not exceed 220 million Btu per hour (mmBtu/hr).
- c.
 - i. The consumption of natural gas by the affected boiler shall not exceed 160 million scf per month (mmscf/mo) and 1,097 mmscf/yr.
 - ii. The usage of distillate fuel oil by the affected boiler shall not exceed 730,000 gallons per year.
 - iii. Compliance with these annual emission limits and, unless otherwise specified in a particular condition, other annual limits set by this permit shall be determined from a running total of 12 months of data, i.e., from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

5. Emissions

- a.
 - i. The emissions of the affected boiler shall not exceed the following limits:

Pollutant	Emission Limits		
	Lb/mmBtu ³		Tons/Month
	Gas	Oil	
			Tons/Year

NO _x	0.061		5.4	37.2
CO	0.150	0.155	12.5	91.9
PM ¹	0.0019	0.030	1.6	2.6
PM ₁₀ /PM _{2.5} ²	0.0075	0.030	1.8	5.7
VOM	0.004		0.3	2.4
GHG, as CO ₂ e	117	155	11,900	73,800

¹ PM only includes filterable particulate as measured by USEPA Method 5 or other appropriate USEPA Test Method for PM.

² PM₁₀ and PM_{2.5} include both filterable and condensable particulate.

³ For pollutant other than for NO_x, compliance with the limits in lb/mmBtu shall be determined on a three hour average or based on the results of stack tests (average of two or three test runs, each nominally one-hour duration). Compliance with the limit for NO_x in lb/mmBtu shall be determined on a 30-day rolling average basis, using the methodology of the NSPS.

ii. Notwithstanding the above, if the affected boiler fires oil during gas curtailments and/or gas supply interruptions for more than 24 hours during a 30-day rolling period, the average NO_x emissions of the boiler during the gas curtailments and/or interruptions shall not exceed 0.070 lb/mmBtu and the emissions during such gas curtailments and/or interruptions shall not be considered in determining compliance with the NO_x limit in Condition 5(a)(i) (i.e., 0.061 lb/mmBtu), during such 30-day period.

c. This permit is issued based on minimal emissions of SO₂ from the affected boiler. For this purpose, the SO₂ emissions of the boiler shall not exceed 1.1 tons/year.

6. Requirements for Performance Testing

a. Pursuant to 40 CFR 60.46b(c) and (e), for the affected boiler for emissions of NO_x, the Permittee shall comply with the applicable requirements of the NSPS for performance testing using the continuous system for monitoring NO_x under 40 CFR 60.48b(b).

b. i. Notwithstanding the above, if the Illinois EPA approves an operational monitoring plan for the affected boiler, as provided for by 40 CFR 60.48b(g)(2) and 60.49b(c), rather than using a continuous emissions monitoring system for NO_x, the Permittee may conduct performance tests for NO_x by monitoring the boiler's operating conditions and predicting the NO_x emissions of the boiler in accordance with the plan that has been approved by the Illinois EPA.

ii. In addition, beginning January 1, 2015, if the Permittee does not conduct operate a Continuous Emission Monitoring System for NO_x, this operational monitoring plan shall also meet the requirements for a Predictive Emission Monitoring System that are set forth in 35 IAC 217.157(f) (See also Condition 9.)

7. Requirements for Emission Testing

- a. i. A. Within one year after beginning routine operation of the affected boiler, the Permittee shall have tests conducted for the boiler for emissions of CO, VOM, and PM₁₀/PM_{2.5}, as specified below, at its expense by a qualified testing service while the affected boiler is firing natural gas and operating in the maximum load range and other representative operating conditions.
- B. Notwithstanding the above, testing for CO is not required if the affected boiler is equipped with instrumentation for CO that can be used to provide emission data for the boilers in pounds/hour and ppm at 50 percent excess air.
- ii. In addition to the testing required above, the Permittee shall have emission testing performed for CO, VOM, PM, PM₁₀, PM_{2.5} and/or NO_x, as specified by the Illinois EPA in the request, within 90 days of a written request by the Illinois EPA or such later date agreed to by the Illinois EPA.
- b. i. Applicable USEPA test methods and procedures shall be used for testing emissions of the affected boilers, including the following methods unless another method is approved by the Illinois EPA.

Carbon Monoxide	Method 10
Nitrogen Oxide	Method 19
Volatile Organic Material	Method 18, 25 and/or 25A
PM ₁₀ /PM _{2.5} (filterable)	Method 201A or Method 5*
Condensable particulate	Method 202 or Method 5**

* Testing may be conducted using USEPA Method 5 if the Permittee reports all PM emissions measured by this method as filterable PM₁₀ and PM_{2.5}, in which case testing using USEPA Method 201A need not be performed.

** Testing may be conducted using USEPA Method 5 if the Permittee reports all particulate material collected in the back half of the sampling train with this method as condensable particulate, in which case using Method 202 need not be performed.

- ii. If visible emissions are normally present during the operation of the affected boiler, the Permittee shall have observations of the opacity of the emissions of the boiler conducted in accordance with USEPA Method 9 during this emission testing.
- c. The Permittee shall submit a test plan to the Illinois EPA at least 60 days prior to this testing.
- d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification and test protocol for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided

that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe testing.

- e. Three copies of the Final Report for these tests shall be promptly submitted to the Illinois EPA and in no case later than 60 days after the completion of the testing, and shall include as a minimum:
 - i. A summary of results that includes measured emission rates, emission rates in the terms of the applicable limits (e.g., lbs/hour and lbs/mmBtu), and whether compliance was demonstrated with applicable limits.
 - ii. Description of test methods and procedures used, including description of sampling train, analysis equipment, and test schedule.
 - iii. Detailed description of operating conditions during the period of testing, including operating parameters of the boiler (e.g., heat input, and oxygen content in the flue gas leaving the boiler).
 - iv. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.
 - v. Monitored emissions of NO_x during the period of testing.
 - vi. Opacity data if opacity observations were conducted during the period of testing (see Condition 6(b)(ii).)
- g. Copies of emission test reports shall be retained for at least five years after the date that an emission test is superseded by a more recent test.
- 8. Requirements for Opacity Observations
 - a. The Permittee shall have the opacity of the emissions from the affected boiler during representative operating conditions determined in accordance with USEPA Method 9 within 30 days of a written request from the Illinois EPA. The duration of opacity observations shall be at least 30 minutes (five 6-minute averages) unless the average opacities for the first 12 minutes of observations (two 6-minute averages) are both less than 10.0 percent.
 - b. The Permittee shall submit a written report for these observations which report shall be submitted within 30 days of the date of observations. This report shall include:
 - i. Date and time of observations.
 - ii. Name and employer of qualified observer.
 - iii. Copy of current Method 9 certification.
 - iv. Description of weather observation conditions during observations.

- v. Description of the operating conditions of the boiler.
 - vi. Raw data.
 - vii. Opacity determinations.
 - viii. Conclusions.
9. Requirements for Monitoring of NO_x Emissions
- a. Until and unless the Illinois EPA approves an operational monitoring plan for the NO_x emissions of the affected boiler in accordance with 40 CFR 60.49b(c), the Permittee shall conduct continuous monitoring for emissions of NO_x in accordance with the requirements of the NSPS, including 40 CFR 60.48b(b), e.g., the Permittee shall install, calibrate, maintain, and operate a Continuous Emission Monitoring System for measuring NO_x and O₂ (or CO₂) emissions discharged to the atmosphere, and shall record the output of the system, as required in 40 CFR 60.48b(c), (d), (e) and (f).
 - b.
 - i. If the Illinois EPA approves an operational monitoring plan for the NO_x emissions of the affected boiler, including a plan that also fulfills requirements for a Predictive Emission Monitoring System in 35 IAC 217.157(f), the Permittee shall either conduct operational monitoring, including associated recordkeeping and reporting, in accordance with the approved plan or conduct continuous emissions monitoring for NO_x as addressed above.
 - ii. As part of its proposed operational monitoring plan, the Permittee shall submit data for the NO_x emissions of the affected boiler collected with the Continuous Emission Monitoring System for NO_x that is otherwise required by 40 CFR 60.48b and 35 IAC 217.157(a). If the Permittee submits a plan that is also intended to meet the requirements for a Predictive Emission Monitoring System in 35 IAC 217.157(f), the submittal shall also show that these requirements will be met.
10. Operational Monitoring Requirements
- a. For the affected boiler, the Permittee shall install, operate, and maintain monitor(s) to measure and record fuel consumption.
11. Recordkeeping Requirements
- a. For the affected boiler, the Permittee shall comply with the applicable recordkeeping requirements of the NSPS, including 40 CFR 60.7(b) and (f) and 60.49b(d) and (g).
 - b. The Permittee shall maintain a file or other records containing the following information for the affected boiler:
 - i. The manufacturer's specifications for the boiler including emissions guarantees and rated heat input capacity (mmBtu/hour).

- ii. The operating and maintenance procedures for the boiler recommended by the manufacturer.
- c. The Permittee shall keep the following operating records for the affected boiler:
 - i. Daily records of fuel usage and monthly records of annual capacity factor, as required by 40 CFR 60.49b(d).
 - ii. Records for the usage of fuel oil by the affected boiler (gallons/calendar year, by type of oil).
 - iii. Date, time, and duration of any period when a fuel other than natural gas was fired in the boiler, with the identity and amount of such fuel that was fired and the reason such fuel was fired, e.g., gas curtailment, gas supply interruption, or periodic testing.
 - iv. The total duration of periodic testing while firing a fuel other than natural gas (hours per calendar year).
 - v. An inspection, maintenance and repair log, including date and nature of activity.
- d. For the affected boiler, the Permittee shall comply with the applicable recordkeeping requirements of 35 IAC 217.156, including 35 IAC 217.156(a), (b) and (c).
- e. The Permittee shall maintain the following records related to the emissions of the affected boiler:
 - i. A file containing a demonstration that the emissions of the boiler when operating normally will comply with the applicable hourly emission limits in Table 1, with supporting documentation, which information shall be kept current.
 - ii. Records of the NO_x emissions of the boiler and other related information as required each operating day by 40 CFR 60.49b(g).
 - iii. Records of the boiler's emissions of NO_x, CO, PM, PM₁₀, PM_{2.5}, VOM and GHG, as CO₂e (tons/month and tons/year), with supporting calculations.
- f. If a backup fuel other than ultra low sulfur distillate oil is used for the affected boiler, the Permittee shall maintain the following records related to the use of backup:
 - i. The sulfur content of the backup fuel(s) (pounds/mmBtu), with supporting documentation.
 - ii. The actual SO₂ emissions of the affected boiler from firing backup fuel (tons/month and tons/year), with supporting calculations.
- g. The Permittee shall keep records for all opacity measurements made in accordance with USEPA Method 9 for the affected boiler that it conducts

or that are conducted at its behest. For each occasion on which such measurements are made, these records shall include the formal report for the measurements if conducted pursuant to Condition 6(c) or otherwise the identity of the observer, a description of the measurements that were made, the operating condition of the boiler, the observed opacity, and copies of the raw data sheets for the measurements.

- h. Unless otherwise specified, all records required by this permit shall be retained at a readily accessible location at the source for at least five years from the date of entry and shall be made available for inspection and copying by the Illinois EPA or USEPA 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 or USEPA request for records during the course of a source inspection.

12. Reporting Requirements

- a. For the affected boiler, the Permittee shall comply with the applicable notification and reporting requirements of the NSPS, including 40 CFR 60.7(a), (c), (d) and (e) and 60.49b(b).
- b. For the affected boiler, the Permittee shall comply with the applicable reporting requirements of 35 IAC 217.155, 217.156(g), (h), (i) and (j), as applicable. For this purpose, a Predictive Emission Monitoring System is considered a Continuous Emission Monitoring System.
- c. If there is a deviation of the requirements of this permit, not otherwise addressed pursuant to the above reporting requirements, the Permittee shall submit a report to the Illinois EPA within 30 days after deviation. The report shall include a description of the deviation, the probable cause of the deviations, the corrective actions that were taken and any actions taken to reduce future occurrences.
- d. Two copies of all reports and notifications required by this permit shall be sent to the Illinois EPA, Division of Air Pollution Control, Compliance Section, in Springfield and one copy shall be sent to the Illinois EPA, Air Regional Office in Des Plaines.

13. Authorization for Operation

- a. Under this permit, the affected boiler may be operated for a period of one year from initial startup to allow for equipment shakedown and emissions testing as required. This period may be extended by the Illinois EPA upon request of the Permittee if additional time is needed to complete shakedown or perform emission testing.
- b. Upon completion of the initial performance test for NO_x required by Condition 6(a), the Permittee may continue to operate the affected boiler until a new or revised CAAPP permit is issued that addresses the boiler, provided that a timely and complete application for such CAAPP permit is submitted in accordance with Section 39.5(5) of the Environmental Protection Act.

c. This condition supersedes Standard Condition 6.

If you have any questions on this permit, please call Manish Patel at 217/785-1705.

Robert W. Bernoteit
Acting Manager, Permit Section
Division of Air Pollution Control

Date Signed: _____

RWB:MNP:

Attachments

cc: FOS - Region 1, Illinois EPA
CAAPP Application File - 96080077, Illinois EPA
Lotus Notes