217/785-1705

CONSTRUCTION PERMIT – REVISED
NSPS SOURCE

PERMITTEE

University of Illinois at Chicago
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Application No.: 98100093 I.D. No.: 031600CRS
Applicant's Designation: Date Received: September 17, 2012
Subject: Gas Turbines (3) and Natural Gas Engines (3)
Date Issued: May 24, 2013
Location: West Campus, 1717 West Taylor Street, Chicago, 60612

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of three 7 MW natural gas-fired gas turbines (each with an 88 mmBtu/hr duct burner), three 5 MW natural gas-fired engine generators each controlled by catalytic converter, and catalytic converters controlling two existing 6.3 MW dual fuel-fired engine generators, as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following Conditions:

1.0 OVERALL SOURCE CONDITIONS

1.1 Source Description

1.1.1 This permit is issued based on the source not being a major source of HAPs.

1.1.2 For purposes of the Clean Air Act Permit Program (CAAPP), the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21, and the Illinois EPA rules for Major Stationary Sources Construction and Modification, 35 Ill. Adm. Code Part 203, the University of Illinois at Chicago West Campus (Medical School) is considered a single source with the University of Illinois at Chicago East Campus (Circle Campus), I.D. No. 031600CEV.

1.2 Applicable Regulations

1.2.1 Specific emission units at this source are subject to particular regulations as set forth in Section 2.0 (Unit-Specific Conditions) of this permit.

1.2.2 In addition, emission units at this source are subject to the following regulations of general applicability:

a. No person shall cause or allow the emission of fugitive particulate matter from any process, including any material handling or storage activity, that is visible by an observer looking generally overhead at a point beyond the property line of the source unless the wind speed is greater than 40.2

kilometers per hour (25 miles per hour), pursuant to 35 Ill. Adm. Code 212.301 and 212.314.

b. The emission of smoke or other particulate matter from any emission unit shall not exceed an opacity of greater than 30 percent, except that an opacity of greater than 30 percent but less than 60 percent shall be allowed for a period or periods aggregating 8 minutes in any 60 minute period provided that such opaque emissions permitted during any 60 minute period shall occur from only one such emission unit located within a 305 meter (1000 feet) radius from the center point of any other such emission unit owned or operated by the Permittee, and provided further that such opaque emissions permitted from each such emission unit shall be limited to 3 times in any 24 hour period, pursuant to 35 Ill. Adm. Code 212.123 and 212.124.

1.3 Non-Applicability Provisions

This revised permit is issued based on Boiler #4 not being subject to the federal New Source Performance Standards (NSPS) for Small Industrial-Commercial-Institutional Steam Generating Units, 40 CFR 60, Subpart Dc. This is because this boiler, which has a rated capacity of 97.1 mmBtu/hr, was constructed prior to June 9, 1989 and the continued use of this boiler will not involve either modification or reconstruction of this boiler.

1.4 Source-Wide Operational and Production Limits and Work Practices

In addition to the source-wide requirements in the Standard Permit Conditions attached hereto, the Permittee shall fulfill the following source-wide operational and production limitations and/or work practice requirements:

a. The three existing natural gas/residual fuel oil-fired boilers (Boilers #1, #2 and #3) located at 1717 West Taylor Street in Chicago shall permanently cease operation prior to the initial startup of the three natural gas-fired gas turbines, the three natural gas-fired duct burners, and the three natural gas-fired engines with catalytic converters.

b. The installation of new catalytic converters for the two existing dual fuel-fired engines (East Campus Engine Generators #1 and #2) located at 1134 S. Morgan Street in Chicago (I.D. No. 031600CEV) shall be commenced prior to the initial startup of the new natural gas-fired gas turbines, duct burners and engines.

1.5 Source-Wide Emission Limitations

1.5.1 Emissions of Hazardous Air Pollutants

This permit is issued based on the emissions of HAPs as listed in Section 112(b) of the Clean Air Act (CAA) not being equal to or exceeding 10 tons per year of a single

HAP or 25 tons per year of any combination of such HAPs, so that this source is considered a minor source for HAPs.

1.5.2 Other Source-Wide Emission Limitations

The limits on emissions of CO, NO_x, PM_{10}, SO_2, and VOM have been established pursuant to the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21, and Illinois' rules for Major Stationary Sources Construction and Modification, 35 Ill. Adm. Code Part 203. These limits ensure that the project addressed in this Construction Permit does not constitute a new major source or major modification pursuant to 35 Ill. Adm. Code Part 203. See Condition 2.1.6, 2.2.6, and 2.3.6.

Note: The emission units with contemporaneous increases in emissions of CO, NO_x, PM_{10}, SO_2, and VOM are described in Table 1 of Attachment A. The emission units or activities used to decrease emissions are described in Tables 2 and 3 of Attachment A. The net change in emissions is described in Table 4 of Attachment A.

1.6 General Recordkeeping Requirements

1.6.1 Emission Records

The Permittee shall maintain records of the following items to demonstrate compliance with Condition 1.5.1:

Total annual emissions on a calendar year basis for the emission units covered by Section 2.0 (Unit Specific Conditions) of this permit.

1.6.2 NSPS Recordkeeping

a. Any owner or operator subject to the provisions of 40 CFR Part 60 shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility [40 CFR 60.7(b)]

b. Any owner or operator subject to the provisions of 40 CFR Part 60 shall maintain a file of all performance testing measurements and all other information required by 40 CFR Part 60 recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, reports, and records [40 CFR 60.7(e)].

1.6.3 Retention and Availability of Records

a. All records and logs required by this permit shall be retained for at least five years from the date of entry (unless a longer retention period is specified by the particular recordkeeping provision herein), shall be kept at a location at the source that is

readily accessible to the Illinois EPA or USEPA, and shall be made available for inspection and copying by the Illinois EPA or USEPA upon request.

b. The Permittee shall retrieve and print, on paper during normal source office hours, any records retained in an electronic format (e.g., computer) in response to an Illinois EPA or USEPA request for records during the course of a source inspection.

1.7 General Reporting Requirements

1.7.1 General Source-Wide Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Compliance Section of noncompliance with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

1.7.2 NSPS Reporting Requirements

Pursuant to 40 CFR 60.7(a), Any owner or operator subject to the provisions of 40 CFR Part 60 shall furnish the Illinois EPA and USEPA written notification as follows:

a. A notification of the date construction (or reconstruction as defined under 40 CFR 60.15) of an affected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form [40 CFR 60.7(a)(1)].

b. A notification of the anticipated date of initial startup of an affected facility postmarked not more than 60 days nor less than 30 days prior to such date [40 CFR 60.7(a)(2)].

c. A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date [40 CFR 60.7(a)(3)].

1.7.3 Reporting for Emissions Decreases/Increases

The Permittee shall notify the Illinois EPA in writing of the actual dates of the following events within 15 days after each such event:

a. The date that each of the three existing boilers (Boilers #1, #2, and #3) ceases operation;

b. The date that construction/installation of the new catalytic converters for the two existing dual fuel-fired engines (East Campus Engine Generators #1 and #2) is commenced; and

c. The date that the new Gas Turbines, Duct Burners, and Engine-Generators initially begin operation.

1.8. Authorization for Operation

Operation of the equipment being constructed and/or modified is allowed under this permit until final action is taken on the Clean Air Act Permit Program (CAAPP) application for this source, provided that such CAAPP application has been received and been deemed complete by the Illinois EPA. As a result, the Permittee must still update the CAAPP application to include the aforementioned equipment but is not required to submit an application for a state operating permit in the interim.

2.0 UNIT SPECIFIC CONDITIONS

2.1 Units GT/DB1-3 Gas Turbine/Duct Burner #1, #2, and #3

2.1.1 Description

Three new natural gas-fired combustion turbines with heat steam recovery generators will be installed to provide electric power and steam to this source. The units will be equipped with natural gas-fired duct burners, rated at 88 mmBtu/hr each, to be able to boost the temperature of the flue gas from the turbines for steam production. Emissions of nitrogen oxides (NO_x) from the turbines and the duct burners are controlled by the design of the burners systems.

2.1.2 List of Emission Units and Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
GT1	Solar Taurus 70-T9702 or Equivalent 7 MW Turbine (Gas Turbine #1)	None
DB1	88 mmBtu/hr Natural Gas-Fired Duct Burner (Duct Burner #1)	None
GT2	Solar Taurus 70-T9702 or Equivalent 7 MW Turbine (Gas Turbine #2)	None
DB2	88 mmBtu/hr Natural Gas-Fired Duct Burner (Duct Burner #2)	None
GT3	Solar Taurus 70-T9702 or Equivalent 7 MW Turbine (Gas Turbine #3)	None
DB3	88 mmBtu/hr Natural Gas-Fired Duct Burner (Duct Burner #3)	None

2.1.3 Applicability Provisions and Applicable Regulations

a. Gas Turbines/Duct Burners #1, #2, and #3 are referred to as “affected gas turbines” for the purpose of these unit-specific conditions.

b. Each affected gas turbine is subject to the emission standard identified in Condition 1.2.2(b).

c. The affected gas turbines are subject to the New Source Performance Standard (NSPS) for Stationary Gas Turbines, 40 CFR 60 Subparts A and GG, because the heat input at peak load is equal to or greater than 10.7 gigajoules per hour (10 mmBtu/hr), based on the lower heating value of the fuel fired and the gas turbine commenced construction, modification, or reconstruction after October 3, 1977, and that has a peak load less than or equal to 107.2 gigajoules per hour (100 mmBtu/hr). The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.

i. Pursuant to 40 CFR 60.332(a)(2) and 60.332(c), no owner or operator of an affected gas turbine with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 million Btu/hour) but less than or equal to 107.2 gigajoules per hour (100 million Btu/hour) based on the lower heating value of the fuel fired shall cause to be discharged into the atmosphere from such gas turbine, any gases which contain nitrogen oxides in excess of:

$$STD = 0.015\frac{(14.4)}{Y} + F$$

Where:

STD = allowable NO_x emissions (percent by volume at 15 percent oxygen and on a dry basis).

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour.

F = NO_x emission allowance for fuel-bound nitrogen calculated from the nitrogen content of the fuel as follows:

Fuel-bound nitrogen (percent by weight)	F (NO_x percent by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04 (N)
$0.1 < N \leq 0.25$	0.04 + 0.0067(N - 0.1)
$N > 0.25$	0.005

where:

N = the nitrogen content of the fuel (percent by weight) determined in accordance with Condition 2.1.7(e).

ii. Standard for Sulfur Dioxide (SO_2)

A. No owner or operator subject to the provisions of 40 CFR 60 Subpart GG shall cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain SO_2 in excess of 0.015 percent by volume at 15 percent oxygen and on a dry basis [40 CFR 60.333(a)].

B. No owner or operator subject to the provisions of 40 CFR 60 Subpart GG shall burn in any stationary gas turbine any fuel which contains sulfur in excess of 0.8 percent by weight [40 CFR 60.333(b)].

d. No person shall cause or allow the emission of SO_2 into the atmosphere from any process emission unit to exceed 2000 ppm, [35 Ill. Adm. Code 214.301].

e. No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit, except as provided in 35 Ill. Adm. Code 218.302, 218.303, or 218.304 and the following exemption: If no odor nuisance exists the limitation of 35 Ill. Adm. Code 218 Subpart G shall only apply to photochemically reactive material [35 Ill. Adm. Code 218.301].

2.1.4 Non-Applicability of Regulations of Concern

a. The affected gas turbines are not subject to 35 Ill. Adm. Code 216.121, emissions of carbon monoxide (CO) from fuel combustion emission units, because the affected gas turbines are not by definition fuel combustion emission units.

b. The affected gas turbines are not subject to 35 Ill. Adm. Code 217.121, emissions of nitrogen oxides (NO_x) from new fuel combustion emission sources, because the actual heat input of each unit is less than 73.2 MW (250 mmBtu/hr) and the affected gas turbines are not by definition fuel combustion emission units.

c. This permit is issued based on the affected gas turbines not being subject to 35 Ill. Adm. Code 212.321 because due to the unique nature of this processes, such rules cannot reasonably be applied.

d. The affected gas turbines are not subject to 35 Ill. Adm. Code 212.324, Process Emission Units In Certain Areas, because the source is not located in an area identified in 35 Ill. Adm. Code 212.324(a)(1).

2.1.5 Operational Work Practices

a. At all times, including periods of startup, shutdown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate any affected gas turbine in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Illinois EPA or the USEPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and

maintenance procedures, and inspection of the source [40 CFR 60.11(d)].

b. The affected gas turbines shall only be operated with natural gas as the fuel.

2.1.6 Operation and Emission Limitations

a. Emissions and operation of affected gas turbines shall not exceed the following limits:

i. Fuel Usage:

Unit	Fuel Usage (Mft^3/mo)	Fuel Usage (Mft^3/yr)
Gas Turbines #1-#3 (combined)	322.89	1,937.34
Duct Burners #1-#3 (combined)	280.91	1,685.43

ii. Emissions of CO and VOM:

	EMISSIONS			
	CO		VOM	
Unit	Ton/mo	Ton/yr	Ton/mo	Ton/yr
Gas Turbines #1-#3 (combined)	17.73	106.36	1.42	8.54
Duct Burners #1-#3 (combined)	10.11	60.68	2.40	14.41
Totals		167.04		22.95

Note: These limits are based on representations of the maximum actual emissions determined from emission factors supplied by the manufacturer/vendor of the affected gas turbine equipment, the maximum annual fuel usage, and a lower heating value heat content of natural gas of 900 Btu/ft^3.

iii. Emissions of NO_x and SO_2:

	NO_x		SO_2	
Unit	Ton/mo	Ton/yr	Ton/mo	Ton/yr
Gas Turbines #1-#3 (combined)	14.53	87.18	1.37	8.19
Duct Burners #1-#3 (combined)	13.90	83.43	0.08	0.46
Totals		170.61		8.65

Note: These limits are based on representations of the maximum actual emissions determined from emission factors supplied by the manufacturer/vendor of the equipment, the standard emission factor for SO_2 for both the gas turbine and duct burner, the maximum firing rates, and a lower heating value heat content of natural gas of 900 Btu/ft^3.

iv. Emissions of Particulate $Matter_{10}$ (PM_{10}):

Unit	PM_{10} Ton/mo	Ton/yr
Gas Turbines #1 - #3 (combined)	3.63	21.77
Duct Burners #1 - #3 (combined)	1.26	7.58
Total		29.35

Note: These limits are based on representations of the maximum actual emissions determined from emission factors supplied by the manufacturer/vendor of the affected gas turbine equipment, the maximum annual fuel usage, and a lower heating value heat content of natural gas of 900 Btu/ft^3.

b. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

c. The above limitations were established pursuant to 35 Ill. Adm. Code Part 203 and 40 CFR 52.21. These limits ensure that this project does not constitute a major modification pursuant to Title I of the Clean Air Act, specifically, 35 Ill. Adm. Code Part 203 and 40 CFR 52.21.

2.1.7 Testing Requirements

a. To compute the NO_x emissions, the owner or operator shall use analytical methods and procedures that are accurate to within 5 percent and are approved by the Illinois EPA or the USEPA to determine the nitrogen content of the fuel being fired [40 CFR 60.335(a)].

b. In conducting the performance tests required in 40 CFR 60.8, the owner or operator shall use as reference methods and procedures the test methods in appendix A of 40 CFR Part 60 or other methods and procedures as specified in this section, except as provided for in 40 CFR 60.8(b). Acceptable alternative methods and procedures are given in 40 CFR 60.335(f) [40 CFR 60.335(b)].

c. Pursuant to 40 CFR 60.335(c), the owner or operator shall determine compliance with the NO_x and SO_2 standards in Condition 2.1.3(c) (see also 40 CFR 60.332 and 60.333(a)) as follows:

i. Pursuant to 40 CFR 60.335(b)(1), the NO_x emission rate shall be computed for each run using the following equation:

$$NO_x = (NO_{xo})(P_r/P_o)^{0.5} e^{19(H_o - 0.00633)} (288^oK/T_a)^{1.53}$$

where:

NO_x = emission rate of NO_x at 15 percent O_2 and ISO standard ambient conditions, volume percent.

NO_{xo} = observed NO_x concentration, ppm by volume.

P_r = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mmHg.

P_o = observed combustor inlet absolute pressure at test, mm Hg.

H_o = observed humidity of ambient air, g H_2O/g air.

e = transcendental constant, 2.718.

T_a = ambient temperature, °K.

ii. The monitoring device of Condition 2.1.8(a) (see also 40 CFR 60.334(a)) shall be used to determine the fuel consumption and the water-to-fuel ratio necessary to comply with Condition 2.1.3(c)(i) (see also 40 CFR 60.332) at 30, 50, 75, and 100 percent of peak load or at four points in the normal operating range of the gas turbine, including the minimum point in the range and peak load. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer [40 CFR 60.335(c)(2)].

iii. Method 20 shall be used to determine the NO_x, SO_2, and oxygen concentrations. The span values shall be 300 ppm of nitrogen oxide and 21 percent oxygen. The NO_x emissions shall be determined at each of the load conditions specified in Condition 2.1.7(c)(ii) (see also 40 CFR 60.335(c)(2)) [40 CFR 60.335(c)(3)].

d. The owner or operator shall determine compliance with the sulfur content standard in Condition 2.1.3(c)(ii) (see also 40 CFR 60.333(b)) as follows: ASTM D 2880-71 shall be used to determine the sulfur content of liquid fuels and ASTM D 1072-80, D 3031-81, D 4084-82, or D 3246-81 shall be used for the sulfur content of gaseous fuels. The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the approval of the Illinois EPA and/or USEPA [40 CFR 60.335(d)].

e. To meet the requirements of Condition 2.1.8(b) (see also 40 CFR 60.334(b)), the owner or operator shall use the methods specified in Condition 2.1.7(a) and (d) (see also 40 CFR 60.335) to determine the sulfur content and, if applicable, nitrogen and of the fuel being burned. The analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency [40 CFR 60.335(e)].

f. Pursuant to 40 CFR 60.335(c)(1), the owner or operator may use the following as alternatives to the reference methods and procedures specified in Condition 2.1.7 (see also 40 CFR 60.335): Instead of using the equation in Condition 2.1.7(c)(i) (see also 40 CFR 60.335(b)(1)), manufacturers may develop ambient condition correction factors to adjust the nitrogen oxides emission level measured by the performance test as provided in 40 CFR 60.8 to ISO standard day conditions.

2.1.8 Monitoring Requirements

a. The owner or operator of any stationary gas turbine subject to the provisions of 40 CFR 60 Subpart GG shall comply with applicable operational monitoring requirements of 40 CFR 60.334.

b. The owner or operator of any stationary gas turbine subject to the provisions of 40 CFR 60 Subpart GG shall monitor the sulfur content and, if applicable, nitrogen content of the fuel being fired in the turbine in accordance with applicable requirements of 40 CFR 60.334(h) and 60.335(b).

2.1.9 Recordkeeping Requirements

In addition to the records required by Condition 1.6, the Permittee shall maintain records of the following items for the affected gas turbines:

a. An operating log for each affected gas turbine that includes the information required by Condition 1.6.2(a) (see also 40 CFR 60.7(b)).

b. A file that includes the information required by Condition No 1.6.2(b) (see also 40 CFR 60.7(e)), including the nitrogen content of the fuel relied upon, if greater than zero, to determine the applicable standard pursuant to Condition 2.1.3(c)(i) and show compliance with such standard and the hourly emission limit pursuant to Condition 2.1.6.

c. Records of the testing pursuant to Condition 2.1.7, which include the following:

i. The date, place and time of sampling or measurements;

ii. The date(s) analyses were performed;

iii. The company or entity that performed the analyses;

iv. The analytical techniques or methods used;

v. The results of such analyses; and

vi. The operating conditions as existing at the time of sampling or measurement.

d. Natural gas fuel usage for each affected gas turbine, ft^3/mo and ft^3/yr;

e. The nitrogen content of the fuel to be used in the affected gas turbine recorded on a daily basis, except as provided in Condition 2.1.8(b);

f. The sulfur content of the fuel to be used in the affected gas turbine as monitored pursuant to Condition 2.1.8(b);

g. The heat content of the fuel used in the affected gas turbine, Btu/ft^3; and

h. Monthly and annual aggregate CO, NO_x, PM_{10}, SO_2, and VOM emissions from the affected gas turbines shall be maintained, based on fuel consumption and the applicable emission factors, with supporting calculations.

2.1.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Bureau of Air, Compliance Section of noncompliance of an affected gas turbine with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:

a. Pursuant to 40 CFR 60.334(c), periods of excess emissions that shall be reported are defined as follows:

i. NO_x. Any period in which the fuel-bound nitrogen of the fuel is greater than the maximum nitrogen content allowed by the fuel-bound nitrogen allowance used during the performance test required by Condition 2.1.7. Each report shall include the average fuel consumption, ambient conditions, gas turbine load, and nitrogen content of the fuel during the period of excess emissions, and the graphs or figures

developed under Condition 2.1.7(a) (see also 40 CFR 60.335(a)) [40 CFR 60.334(c)(1)].

ii. SO_2. Any daily period during which the sulfur content of the fuel being fired in the gas turbine may not comply with Condition 2.1.3(c)(ii) [40 CFR 60.334(c)(2)].

b. Emissions of CO, NO_x, PM_{10}, SO_2, and/or VOM from the affected gas turbine in excess of the limits specified in Condition 2.1.6, based on the current month's records plus the preceding 11 months, within 30 days of such an occurrence.

2.1.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

2.1.12 Compliance Procedures

Compliance with the emission limits in Condition 2.1.6 shall be based on the recordkeeping requirements in Condition 2.1.9, the formulas listed below, and the emission factors listed below unless emission testing or other credible information shows higher emissions.

a. Emissions from Gas Turbines #1, #2, and #3 shall be calculated based on the following:

i. CO, NO_x, PM_{10} and VOM emissions:

Pollutant	Emission Factor (lb/mmBtu)
CO	0.122
NO_x	0.10
PM_{10}	0.024
VOM	0.0098

Note: These are the factors for uncontrolled emissions for the Solar Model Taurus 70-T9702S natural gas-fired gas turbine based on the lower heating value of natural gas and were supplied by the manufacturer/vender.

Gas Turbine Emissions (lb) = (Natural Gas Consumed, ft^3) x (Lower Heating Value Heat Content, Btu/ft^3) x (1 mmBtu/1,000,000 Btu) x (The Appropriate Emission Factor, lb/mmBtu)

ii. SO_2 emissions:

Pollutant	Emission Factor (lb/mmBtu)
SO_2	0.94 S

Note: This is the emission factor for uncontrolled gas turbines, Table 3.1-1, AP-42,

Fifth Edition, October, 1996. S is the sulfur content of the fuel, in percent by weight.

Gas Turbine Emissions (lb) = (Natural Gas Consumed, ft^3) x (Lower Heating Value Heat Content, Btu/ft^3) x (1 mmBtu/1,000,000 Btu) x (Emission Factor, lb/mmBtu)

b. Emissions from Duct Burners #1, #2, and #3 shall be calculated based on the following:

i. CO, NO_x, PM_{10} and VOM emissions:

Pollutant	Emission Factor (lb/mmBtu)
CO	0.08
NO_x	0.11
PM_{10}	0.01
VOM	0.019

Note: These are the factors for uncontrolled emission from the natural gas-fired duct burners based on the lower heating value of natural gas as provided by the manufacturer/vender.

Duct Burner Emissions (lb) = (Natural Gas Consumed, ft^3) x (Lower Heating Value Heat Content, Btu/ft^3) x (1 mmBtu/1,000,000 Btu) x (The Appropriate Emission Factor, lb/mmBtu)

ii. SO_2 emissions:

Pollutant	Emission Factor (lb/million ft^3)
SO_2	0.6

Note: This is the emission factor for uncontrolled natural gas combustion in small boilers (< 100 mmBtu/hr), Table 1.4-2, AP-42, Fifth Edition, Supplement D, March, 1998.

Duct Burner Emissions (lb) = (Natural Gas Consumed, in million ft^3) x (Emission Factor, lb/million ft^3)

2.2 Units EG1WC - EG3WC West Campus Engine Generators #1 - #3
Controls EG1WC - EG3WC Catalytic Converters

2.2.1 Description

Natural gas-fired reciprocating engines will be installed to provide electrical power. Each engine has a maximum power output of 5 MW. Engine Generators #1, #2, and #3 at the West Campus are equipped with low temperature catalytic converters to control CO and VOM emissions.

2.2.2 List of Emission Units and Emission Control Equipment

Emission Unit	Description	Control Equipment
EG1WC	Wartsila Model No. 18V28 or Equivalent 5 MW Natural Gas-Fired Engine (West Campus Engine Generator #1)	Catalytic Converter
EG2WC	Wartsila Model No. 18V28 or Equivalent 5 MW Natural Gas-Fired Engine (West Campus Engine Generator #2)	Catalytic Converter
EG3WC	Wartsila Model No. 18V28 or Equivalent 5 MW Natural Gas-Fired Engine (West Campus Engine Generator #3)	Catalytic Converter

2.2.3 Applicability Provisions and Applicable Regulations

a. West Campus Engine Generators #1, #2 and #3 are referred to as the “affected engines" for the purpose of these unit-specific conditions.

b. Each affected engine is subject to the emission standard identified in Condition 1.2.2(b).

c. No person shall cause or allow the emission of SO_2 into the atmosphere from any process emission unit to exceed 2000 ppm, [35 Ill. Adm. Code 214.301].

d. No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit, except as provided in 35 Ill. Adm. Code 218.302, 218.303, or 218.304 and the following exemption: If no odor nuisance exists the limitation of 35 Ill. Adm. Code 218 Subpart G shall only apply to photochemically reactive material [35 Ill. Adm. Code 218.301].

2.2.4 Non-Applicability of Regulations of Concern

a. The affected engines are not subject to 35 Ill. Adm. Code 216.121, emissions of CO from fuel combustion emission units, because the affected engines are not by definition fuel combustion emission units.

b. The affected engines are not subject to 35 Ill. Adm. Code 217.121, emissions of NOx from new fuel combustion emission sources, because the engines are not by definition fuel combustion emission units.

c. This permit is issued based on the affected engines not being subject to 35 Ill. Adm. Code 212.321 because, due to the nature of engines, this rule cannot reasonably be applied.

d. The affected engines are not subject to 35 Ill. Adm. Code 212.324, Process Emission Units In Certain Areas, because the source is not located in an area identified in 35 Ill. Adm. Code 212.324(a)(1).

2.2.5 Operational and Production Limits and Work Practices

a. The catalytic converter on an engine shall be operated to control emissions of CO and VOM at all times that an affected engine is operated.

b. The Permittee shall follow good operating practices for the catalytic converters, including periodic inspection, routine maintenance and prompt repair of defects.

c. The affected engines shall only be operated with natural gas as the fuel.

2.2.6 Operational and Emission Limitations

a. Emissions and operation of the affected engines shall not exceed the following limits:

i. Operation and Power Output:

Unit	Rated Output (MW)	Operating Hours (Hours/year)
Generator #1	5	3,066
Generator #2	5	3,066
Generator #3	5	3,066

ii. Emissions:

A. Hourly Emissions (pounds/hour):

Unit	CO	NO_x	PM_{10}	SO_2	VOM
Generator #1	6.52	7.24	0.74	4.23	4.69
Generator #2	6.52	7.24	0.74	4.23	4.69
Generator #3	6.52	7.24	0.74	4.23	4.69

B. Annual Emissions (tons/year)

Unit	CO	NO_x	PM_{10}	SO_2	VOM
Generator #1	10.00	11.10	1.13	6.49	7.19
Generator #2	10.00	11.10	1.13	6.49	7.19
Generator #3	10.00	11.10	1.13	6.49	7.19
Totals	30.00	33.30	3.39	19.47	21.57

Note: These limits are based on representations of the maximum actual emissions determined from the guaranteed emission rates for CO, NO_x, PM_{10} and VOM supplied by the manufacturer/vendor of the engines, the rated power output, and the maximum operating hours of the engines.

b. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

c. The above limitations were established pursuant to 35 Ill. Adm. Code Part 203 and 40 CFR 52.21. They ensure that this project does not constitute a major modification pursuant to Title I of the Clean Air Act, specifically, 35 Ill. Adm. Code Part 203 and 40 CFR 52.21.

2.2.7 Testing Requirements

None

2.2.8 Monitoring Requirements

The Permittee shall install and operate a continuous monitoring system to monitor and record the electrical output of each affected engine.

2.2.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected engines:

a. Records addressing use of good operating practices for the catalytic converters:

i. Records for periodic inspection of the catalytic converters with date, individual performing the inspection, and nature of inspection; and

ii. Records for prompt repair of defects, with identification and description of defect, effect on emissions, date identified, date repaired, and nature of repair.

b. Electric output of each affected engine, kW-hr/mo and kW-hr/yr;

c. Monthly and annual aggregate CO, NO_x, PM, SO_2, and VOM emissions from the affected engines shall be maintained, based on the electrical output of the affected engine and the applicable emission factors, with supporting calculations.

2.2.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Compliance Section of noncompliance of an affected engine with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:

a. Continued operation of an engine with a defect in the catalytic converter that may result in emissions in excess of limits in Condition 2.2.3(d) and/or 2.2.6(a)(ii) within 30 days of such an occurrence.

b. Emissions of CO, NO_x, PM_{10}, SO_2, and/or VOM in excess of the limits in Condition 2.2.6(a)(ii) based on the current month's records plus the preceding 11 months within 30 days of such an occurrence.

c. Operation of an engine in excess of the limit for operating hours in Condition 2.2.6(a)(i) within 30 days of such an occurrence.

2.2.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

2.2.12 Compliance Procedures

Compliance with the emission limits in Condition 2.2.6(a)(ii) shall be based on the recordkeeping requirements in Condition 2.2.9, the formulas listed below and the emission factors listed below unless emission testing or other credible information shows higher emissions:

a. SO_2 Emissions:

Pollutant	Emission Factor (g/kW-hr)
SO_2	0.384

Note: This is the emission factors for the engine supplied by the manufacturer/vendor.

Engine Emissions (lb) = (Electrical Output, kW-hr) x (Emission Factor, g/kW-hr) x (1 lb/453.59 g)

b. The emissions of CO, NO_x, PM_{10} and VOM shall be determined based on the emission rates guaranteed by the manufacturer/vendor of the equipment or the results of emission testing of this equipment or similar equipment and consider the effectiveness of the catalytic converter in controlling emissions of the particular pollutant.

2.3 Units G1EC & G2EC East Campus Engine Generators #1 and #2
Controls G1EC & G2EC Catalytic Converters

2.3.1 Description

Existing Engine Generators #1 and #2 provide electricity and hot water for the University's East Campus (Circle Campus). These engines were constructed in 1990 and will now be equipped with catalytic converters to control emissions of CO and VOM.

These low-speed reciprocating engines normally operate in dual fuel mode, firing a combination of natural gas with a small amount of diesel oil (no more than 1.5 percent). To provide for interruption in the natural gas supply, these engines can also operate entirely on oil.

2.3.2 List of Emission Units and Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
G1EC	Cooper Bessemer Model LSVB-20-GDC 6.3 MW (8,710 bhp) Natural Gas/Diesel Fuel Fired Engine (East Campus Engine Generator #1)	Catalytic Converter (new)
G2EC	Cooper Bessemer Model LSVB-20-GDC 6.3 MW (8,710 bhp) Natural Gas/Diesel Fuel Fired Engine (East Campus Engine Generator #2)	Catalytic Converter (new)

2.3.3 Applicability Provisions and Applicable Regulations

a. East Campus Engine Generators #1 and #2 are referred to as the “affected engines" for the purpose of these unit-specific conditions.

b. Each affected engine is subject to the emission standard identified in Condition 1.2.2(b).

c. No person shall cause or allow the emission of SO_2 into the atmosphere from any process emission unit to exceed 2000 ppm, [35 Ill. Adm. Code 214.301].

d. Pursuant to 35 IAC 214.122(b)(2), 214.162 and 214.304, no person shall cause or allow the emission of SO_2 into the atmosphere in any one hour period from the burning of distillate fuel oil at process emission units located in the Chicago major metropolitan area with actual heat input smaller than, or equal to 73.2 MW (250 mmBtu/hr), to exceed 0.46 kg of SO_2 per MW-hr (0.3 lb/mmBtu) of actual input from the fuel oil.

e. No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit, except as provided in 35 Ill. Adm. Code 218.302, 218.303, or 218.304 and the following exemption: If no odor nuisance exists the limitation of 35 Ill. Adm. Code 218 Subpart G shall only apply to photochemically reactive material [35 Ill. Adm. Code 218.301].

2.3.4 Non-Applicability of Regulations of Concern

a. The affected engines are not subject to 35 Ill. Adm. Code 216.121, emissions of CO from fuel combustion

emission units, because the affected engines are not by definition fuel combustion emission units.

b. The affected engines are not subject to 35 Ill. Adm. Code 217.121, emissions of NO_x from new fuel combustion emission sources, because the affected engines are not by definition fuel combustion emission units.

c. This permit is issued based on the affected engines not being subject to 35 Ill. Adm. Code 212.321 because due to the unique nature of this processes, such rules cannot reasonably be applied.

d. The affected engines are not subject to 35 Ill. Adm. Code 212.324, Process Emission Units In Certain Areas, because the source is not located in an area identified in 35 Ill. Adm. Code 212.324(a)(1).

2.3.5 Operational and Production Limits and Work Practices

a. The catalytic converter on an engine shall be operated to control emissions of CO and VOM at all times that an affected engine is operated.

b. The Permittee shall follow good operating practices for the catalytic converters, including periodic inspection, routine maintenance and prompt repair of defects.

c. The affected engines shall only be operated with natural gas and distillate fuel oil (diesel oil) as the fuels.

d. Distillate fuel oil (Grades No. 1 and 2) with a sulfur content greater than the larger of the following two values shall not be used in the affected engines:

i. 0.28 weight percent, or

ii. The Wt percent given by the formula: Maximum Wt percent sulfur = (0.000015) x (Gross heating value of oil, Btu/lb).

e. The exhaust from the affected engines, following passage through the waste heat recovery steam boilers, shall be released to the atmosphere at a height of at least 88 feet.

2.3.6 Emission Limitations

The affected engines are subject to the following:

a. i. Emissions of NO_x and CO shall be controlled by use of clean burn technology applied to a fuel which under normal operation is no more than 1.5

percent, by heat content, oil with the remainder being natural gas.

ii. The NOx emissions of each affected engine shall not exceed the following limits. The limits in grams per brake horsepower hour (g/bhp-hr) apply at the maximum load of the affected engines. The limits in pounds per hour (lb/hr) apply at all times. Compliance with these limits shall be determined by emissions testing conducted in accordance with Condition 2.3.7, monitoring of operation in accordance with Condition 2.3.8, and records kept in accordance with Condition 2.3.9.

g/bhp-hr	lb/hr
1.9	36.5

Note: Conditions 2.3.6(a)(i) and (ii) restate the determination of Best Available Control Technology that was made for the affected engines in Construction Permit 90010028 pursuant to the PSD rules, 40 CFR 52.21.

iii. Emissions of each affected engine shall not exceed the following limits. Compliance with annual limits shall be determined from a running total of 12 months of data.

Contaminant	lb/hr	Ton/year
NO_x	36.5	160.0
PM	38.4	168.0
SO_2	0.18	0.8

Note: This condition restated the emissions limits that were established for the affected engines in Construction Permit 90010028, pursuant to PSD rules, 40 CFR 52.21.

b. i. Emissions of CO and VOM shall not exceed the following limits:

	E M I S S I O N S			
	CO		VOM	
Unit	lb/hr	Ton/yr	lb/hr	Ton/yr
Generator #1	5.04	20.04	2.49	9.90
Generator #2	5.12	19.67	1.53	5.88
Totals		39.71		15.78

Note. This condition lowers the permitted emissions of the affected engines from the levels set by Construction Permit 90010028. Specifically, CO and VOM from have been reduced from 336 and 87.6 tons/year, respectively, to

account for the addition of the catalytic converters. These limits are based on the results of stack testing and the application of the catalytic converters with minimum control efficiencies of 85% for CO and 70% for VOM.

ii. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

2.3.7 Testing Requirements

a. Within 180 days of the initial startup of the affected engines after the installation of the catalytic converters, emissions of CO, NOx, PM and VOM shall be measured during representative steady state operation. Any adjustments to affected engine operation necessary to comply with Condition 2.3.6 at four points in the normal operating range of the affected engines, including minimum point in the range and peak load, shall be determined during these tests. The ductwork from the affected engines shall include a properly located test port so that the emissions from the affected engines may be tested.

b. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, and 40 CFR 61, Appendix B, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
Particulate Matter	USEPA Method 5
Nitrogen Oxides	USEPA Method 7
Carbon Monoxide	USEPA Method 10
Volatile Organic Material	USEPA Method 25 (25A if outlet VOM cont. < 50 ppmv as C non-CH_4)

2.3.8 Monitoring Requirements

a. The Permittee shall install, maintain, calibrate and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of diesel fuel to natural gas.

b. The Permittee shall install, maintain, and operate a continuous monitoring system for the concentration of nitrogen oxide in the ambient air.

i. This monitoring equipment shall be installed at a representative location in the vicinity of the affected engines. The equipment shall operate so as to provide data for at least two calendar

years following the installation of the affected engines.

ii. The monitoring activity shall be conducted in conformance with applicable requirements of 40 CFR Parts 50 and 52. The monitoring activity, including location, specific equipment, and operating and calibration procedures shall be approved in advance by the Illinois EPA to assure compliance with 40 CFR Parts 50 and 52. All communication with regard to this monitoring activity shall be directed to the Air Monitoring Section of the Illinois EPA's Division of Air Pollution Control.

2.3.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected engines:

a. Records of the testing pursuant to Condition 2.3.7, which include the following:

i. The date, place and time of sampling or measurements;

ii. The date(s) analyses were performed;

iii. The company or entity that performed the analyses;

iv. The analytical techniques or methods used;

v. The results of such analyses; and

vi. The operating conditions as existing at the time of sampling or measurement.

b. The Permittee shall maintain records for the continuous monitoring equipment as follows:

i. A permanent record of the output of the continuous monitoring systems required by Condition 2.3.8(a); and

ii. A record of maintenance, calibration and operational activity associated with the continuous monitoring equipment.

c. Records addressing use of good operating practices for the catalytic converters:

i. Records for periodic inspection of the catalytic converters with date, individual performing the inspection, and nature of inspection; and

ii. Records for prompt repair of defects, with identification and description of defect, effect on emissions, date identified, date repaired, and nature of repair.

d. Power output of each affected engine, bhp-hr/mo and bhp-hr/yr;

e. Diesel fuel usage for the affected engines, gal/mo and gal/yr;

f. Natural gas fuel usage for the affected engines, Mft^3/mo and Mft^3/yr;

g. The operating schedule of each affected engine; and

h. Records of the monthly and annual aggregate CO, NO_x, PM, SO_2, and VOM emissions from the affected engines, based on power output and the applicable emission factors, with supporting calculations.

2.3.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Bureau of Air, Compliance Section of noncompliance of the affected engine with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:

a. Continued operation of an affected engine with a defect in a catalytic converter that may result in emissions in excess of limits in Condition 2.3.6(b) within 30 days of such an occurrence.

b. Emissions of CO, NO_x, PM_{10}, SO_2, and/or VOM in excess of the limits in Condition 2.3.6 based on the current month's records plus the preceding 11 months within 30 days of such an occurrence.

2.3.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

2.3.12 Compliance Procedures

Compliance with the emission limits in Condition 2.3.6 shall be based on the recordkeeping requirements in Condition 2.3.9, the formulas listed below, and the emission rates and emission factors listed below unless emission testing or other credible information shows higher emission rates or emission factors:

a. Affected engine #1 in dual fuel mode:

i. Emissions of NO_x, PM, and SO_2:

Pollutant	Emission Rate (lb/hr)
NO_x	22.300
PM	0.224
SO_2	0.180

Note: These are the hourly emission rates of NO_x, PM, and SO_2 determined from stack testing.

ii. Emissions of CO and VOM:

Uncontrolled rates of 33.6 lb/hr and 8.3 lb/hr, respectively which are the uncontrolled emission rates determined from stack testing, and the efficiency provided by the catalytic converter.

Emissions (lb) = (Uncontrolled Hourly Emission Rate, lb/hr) x (Operating Hours, hr) x [1 - (Catalytic Converter Efficiency* (%)/100)]

*As specified by the manufacturer.

b. Affected engine #2 in dual fuel mode:

i. Emissions of NO_x, PM and SO_2:

Pollutant	Emission Rate (lb/hr)
NO_x	21.200
PM	0.211
SO_2	0.180

Note: These are the hourly emission rates of NO_x, PM and SO_2 determined from stack testing.

ii. Emissions of CO and VOM:

Uncontrolled rates of 34.1 lb/hr and 5.1 lb/hr, respectively, which are the uncontrolled emission rates determined from stack testing, and the efficiency provided by the catalytic converter.

Emissions (lb) = (Uncontrolled Hourly Emission Rate, lb/hr) x (Operating Hours, hr) x [1 - (Catalytic Converter Efficiency* (%)/100)]

*As specified by the manufacturer of the converter.

c. Operation of the affected engines with diesel fuel (not dual fuel mode):

i. Affected engine # 1 - CO and NO_x:

	Emission Factor @ 75% Load	@ 110% Load
Pollutant	(g/bhp-hr)	(g/bhp-hr)
CO	0.10	0.16
NO_x	9.63	9.12

Note: These are the emission factors for this engine determined by the manufacturer from testing performed at the factory.

Emissions (lb) = (Power Output of Engine, bhp-hr) x (Appropriate Emission Factor, g/bhp-hr) x (1 lb/454 g) x [1 - (Catalytic Converter Efficiency* (%)/100)]

*As specified by the manufacturer of the converter.

ii. Affected engine #2 - CO and NO_x:

Pollutant	Emission Factor @ 75% Load (g/bhp-hr)	Emission Factor @ 110% Load (g/bhp-hr)
CO	0.10	0.16
NO_x	9.63	9.55

Note: These are the emission factors for this engine determined by the manufacturer from testing performed at the factory.

Emissions (lb) = (Power Output of Engine, bhp-hr) x (Appropriate Emission Factor, g/bhp-hr) x (1 lb/454 g) x [1 - (Catalytic Converter Efficiency* (%)/100)]

* Applicable to CO, as specified by the manufacturer of the converter.

iii. Emissions of PM, SO_2 and VOM:

Pollutant	Emission Factor (lb/hp-hr)
PM	0.0007
SO_2	0.00809 S
VOM	0.000705

Note: These are the emission factors for large stationary diesel engines, Table 3.4-1, AP-42, Volume 1, Fifth Edition, Supplement D, October 1996. S is the sulfur content of the oil, in percent by weight. The VOM emission factor is based on the TOC factor.

Emissions (lb) = (Power Output of Engine, bhp-hr) x (Appropriate Emission Factor, lb/hp-hr) x [1 - (Catalytic Converter Efficiency* (%)/100)]

*Applicable to VOM, as specified by the manufacturer of the converter.

3.0 GENERAL PERMIT CONDITIONS

3.1 Testing Procedures

Tests conducted to measure efficiency of pollution control devices, emissions from process or control equipment, or other parameters shall be conducted using standard test methods. Documentation of the test date, conditions, methodologies, calculations, and test results shall be retained pursuant to the recordkeeping procedures of this permit. Reports of any tests conducted as required by this permit or as the result of a request by the Illinois EPA shall be submitted as specified in Condition 3.2.

3.2 Reporting Requirements

3.2.1 Monitoring Reports

A report summarizing required monitoring as specified in the conditions of this permit shall be submitted to the Air Compliance Section of the Illinois EPA every six months as follows:

Monitoring Period	Report Due Date
January - June	September 1
July - December	March 1

All instances of deviations from permit requirements must be clearly identified in such reports. All such reports shall be certified.

3.2.2 Test Notifications

Unless otherwise specified elsewhere in this permit, a written test plan for any test required by this permit shall be submitted to the Illinois EPA for review at least 60 days prior to the testing. The notification shall include at a minimum:

a. The name and identification of the affected unit(s);

b. The person(s) who will be performing sampling and analysis and their experience with similar tests;

c. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the source and any control equipment will be determined;

d. The specific determination of emissions and operation which are intended to be made, including sampling and monitoring locations;

e. The test method(s) which will be used, with the specific analysis method, if the method can be used with different analysis methods;

f. Any minor changes in standard methodology proposed to accommodate the specific circumstances of testing, with justification; and

g. Any proposed use of an alternative test method, with detailed justification.

3.2.3 Test Reports

Unless otherwise specified elsewhere in this permit, the results of any test required by this permit shall be submitted to the Illinois EPA within 60 days of completion of the testing. The test report shall include at a minimum:

a. The name and identification of the affected unit(s);

b. The date and time of the sampling or measurements;

c. The date any analyses were performed;

d. The name of the company that performed the tests and/or analyses;

e. The test and analytical methodologies used;

f. The results of the tests including raw data, and/or analyses including sample calculations;

g. The operating conditions at the time of the sampling or measurements; and

h. The name of any relevant observers present including the testing company’s representatives, any Illinois EPA or USEPA representatives, and the representatives of the source.

3.2.4 Reporting Addresses

a. The following addresses should be utilized for the submittal of reports, notifications, and renewals:

i. Illinois EPA - Air Compliance Section

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

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

ii. Illinois EPA - Air Regional Field Office

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

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

iii. Illinois EPA - Air Permit Section

Illinois Environmental Protection Agency (MC 11)
Division of Air Pollution Control
Permit Section
P.O. Box 19506
Springfield, Illinois 62794-9506

iv. USEPA Region 5 - Air Branch

USEPA (AR - 17J)
Air & Radiation Division
77 West Jackson Boulevard
Chicago, Illinois 60604

b. Unless otherwise specified in the particular provision of this permit, reports shall be sent to the Illinois EPA - Air Compliance Section with a copy sent to the Illinois EPA - Air Regional Field Office.

It should be noted that this permit has been revised at the request of the Permittee to no longer rely on decreases in emissions from the permanent shut down of Boiler #4 and to allow the operation of this boiler to continue. This change will facilitate operation to reliably supply steam to the West Campus. This revised permit also clarifies certain provisions of the original permit.

The issuance of this revised permit does not require the Permittee to again fulfill “one-time” requirements of the original permit that have already been satisfied. In particular, this revised permit does not require that the initial emission testing for new and existing emission units specified by Conditions 2.1.7, 2.2.7 and 2.3.7 be repeated. It also does not require that the initial notifications specified by Conditions 1.7.2 and 1.7.3 be repeated or that a pending CAAPP application be updated as specified by Condition 1.8.

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

Edwin C. Bakowski, P.E. Date Signed: _____
Manager, Permit Section
Division of Air Pollution Control

ECB:CPR:MNP:jws

cc: Illinois EPA, FOS, Region 1

USEPA
Lotus Notes

Attachment A
Table 1

Previous Contemporaneous Emissions Increases (tons/year)*

Emission Unit/Activity	Permit	Date Issued
East Campus Boilers and Engines	97050128	December 1, 1997

CO	NO_x	PM_{10}	SO_2	VOM
+ 99.05	- 40.7	- 6.11	+ 21.47	+20.76

* Data for the contemporaneous increase was changed when CAAPP Permit 96080077 was issued for the West Campus. In particular, the contemporaneous emissions increases from this project at the East Campus were changed as follows.

Permit	CO	NO_x	PM_{10}	SO_2	VOM
CAAPP 96080077	+ 99.05	- 40.7	- 6.11	+ 21.47	+ 20.76
Permit 97050128	+ 95.32	- 58.63	- 2.87	- 1.88	+ 20.08

Tables 2a and 2b
Historical Operation and Emissions Decreases from Existing West Campus Boilers

Table 2a: 1996-1997 Average Fuel Usage

Emission Unit	Natural Gas Usage (Mft^3/yr)	No. 6 Fuel Oil Usage (1,000 gal/yr)
Boiler No. 1	51.3504	1,670.0490
Boiler No. 2	100.8295	2,060.5275
Boiler No. 3	61.1430	639.4780

Table 2b: 1996-1997 Average Emissions from the Existing West Campus Boilers (tons/year)

	E M I S S I O N S				
Emission Unit	CO	NO_x	PM_{10}	SO_2	VOM
Boiler No. 1 (gas)	2.16	7.19	0.20	0.02	0.14
Boiler No. 1 (oil)	4.18	39.25	7.29	129.79	0.94
Boiler No. 2 (gas)	4.23	14.12	0.38	0.03	0.28
Boiler No. 2 (oil)	5.15	48.42	8.99	160.13	1.16
Boiler No. 3 (gas)	2.57	8.56	0.23	0.02	0.17
Boiler No. 3 (oil)	1.60	15.08	2.79	49.70	0.36
Totals	19.89	132.62	19.88	339.69	3.05

This table defines the actual emissions from natural gas and fuel oil combustion from the existing West Campus boilers averaged over calendar years 1996 and 1997 based on the actual fuel usage.

Attachment A (continued)
Tables 3a, 3b and 3c

CO and VOM Emission Decreases from the Existing East Campus Generators

Table 3a: 1996-1997 Average Operation and Emissions

		E M I S S I O N S	
	Operating Hours	CO	VOM
Emission Unit	(Hours/year)	ton/yr	ton/yr
Generator #1	7,951.78	133.59	34.00
Generator #2	7,691.30	131.14	19.61
Totals		264.73	53.61

This table defines the past actual emissions of CO and VOM from the existing engine generators averaged over the calendar years 1996 and 1997 and are based on the actual operating hours and the emission rates determined from the most recent stack testing.

Table 3b: Future Permitted Emissions (tons/year)
(See Condition 2.3.6(b)(i))

Emission Unit	CO	VOM
Generator #1	20.04	9.90
Generator #2	19.67	5.88
Totals	39.71	15.78

This table defines the future permitted emissions of CO and VOM from these units based on the future use of catalytic converters with minimum control efficiencies of 85 percent for CO and 70 percent for VOM.

Table 3c: Net Change in Emissions (tons/year)

Emission Unit	CO	VOM
Generator #1 (Future, from Table 3b)	20.04	9.90
Generator #2 (Future, from Table 3b)	19.67	5.88
Generator #1 (Past Actual, from Table 3a)	-133.59	-34.00
Generator #2 (Past Actual, from Table 3a)	-131.14	-19.61
Totals	-225.02	-37.83

Table 4: Net Changes in Emissions (tons/year)

	E M I S S I O N S				
	CO	NO_x	PM_{10}	SO_2	VOM
New Emission Units					
Gas Turbines #1 - #3 (combined)	106.36	87.18	21.77	8.19	8.54
Duct Burners #1 - #3 (combined)	60.68	83.43	7.58	0.46	14.11
West Generators #1 - 3 (combined)	30.00	33.30	3.39	19.47	21.57
Subtotal	197.04	203.91	32.74	28.12	44.22
Contemporaneous Decreases					
West Boilers No. #1 - 3 (combined)	19.89	132.62	19.88	339.69	3.05
East Generators #1 & 2 (combined)*	225.02	--	--	--	37.83
Subtotal	-244.91	-132.62	-19.88	-339.69	-40.88
Previous Contemporaneous Increase	99.05	-40.7	- 6.11	21.47	20.76
Net Change in Emissions	51.18	30.59	6.75	-290.1	24.10

* There will not be changes in emissions of NO_x, PM_{10} or SO_2 as a result of the addition of catalytic converters to the existing East Campus Generators.

Table 5: Effect of the Revised Permit on the Emissions Decreases from the Existing West Boilers (tons/year)

	CO	NO_x	PM_{10}	SO_2	VOM
Boilers No. #1 - #4 (combined)*	- 23.57	-153.45	-22.55	-383.62	- 3.52
Boilers No. #1 - #3 (combined)**	- 19.89	-132.62	-19.88	-339.69	- 3.05
Change	3.68	20.83	2.67	43.93	0.47

* See Table 2b of the original construction permit.
** See Table 2b of this permit.