



Connecticut Department of

**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

**BUREAU OF AIR MANAGEMENT  
NEW SOURCE REVIEW PERMIT  
TO CONSTRUCT AND OPERATE A STATIONARY SOURCE**

Issued pursuant to Title 22a of the Connecticut General Statutes (CGS) and Section 22a-174-3a of the Regulations of Connecticut State Agencies (RCSA).

Owner/Operator:	Yale University
Address:	135 College Street, 1 <sup>th</sup> Floor New Haven, CT 06510-2411
Equipment Location:	Central Power Plant, 120 Tower Parkway, New Haven, CT
Equipment Description:	Mitsubishi S16R-PTA Diesel Generator No. 3
Collateral Conditions:	Part VII includes collateral conditions which apply to permits 117-0204 through 117-0210

Town-Permit Numbers:	117-0209
Town-Premises Numbers:	117-0048
Prior Permit Issue Dates:	July 1, 1997 (permit to construct & operate)
Modification Issue Date:	August 19, 2011
Expiration Date:	None

/s/ Anne Gobin for  
Daniel C. Esty  
Commissioner

August 19, 2011  
Date

## PERMIT FOR FUEL BURNING EQUIPMENT

### DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION BUREAU OF AIR MANAGEMENT

This permit specifies necessary terms and conditions for the operation of this equipment to comply with state and federal air quality standards. The Permittee shall at all times comply with the terms and conditions stated herein.

#### PART I. DESIGN SPECIFICATIONS

##### A. General Description

Yale University operates the Central Power Plant to provide heat and electricity for the campus. This diesel generator is used for both prime and backup power.

##### B. Equipment Design Specifications

1. Maximum Fuel Firing Rate (gal/hr): 118
2. Maximum Gross Heat Input (MMBTU/hr): 16.4

##### C. Control Equipment Design Specifications

1. Selective Catalytic Reduction (SCR)
  - a. Make and Model: Siemens SiNOx SW40
  - b. Catalyst Type: Base Metal Honeycomb (V<sub>2</sub>O<sub>5</sub>/WO<sub>3</sub>/TiO<sub>2</sub>)
2. Oxidation Catalyst
  - a. Make and Model: Degussa DO 1000 (or equivalent)
  - b. Catalyst Type: Noble Thin Metal Wall Ceramic (Platinum/Palladium on Ceramic Monolith Substrate)

##### D. Stack Parameters

1. Minimum Stack Height (ft): 150
2. Minimum Exhaust Gas Flow Rate at 100% load (acfm): 5,051
3. Minimum Stack Exit Temperature at 100% load (°F): 608
4. Minimum Distance from Stack to Property Line (ft): 20

#### PART II. OPERATIONAL CONDITIONS

##### A. Operating Limits

1. Fuel Type: No. 2 oil
2. Maximum Fuel Consumption over any Consecutive 12 Month Period: 295,000 gallons
3. Maximum Oil Sulfur Content (% by weight, dry basis): 0.05

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#### PART III. CONTINUOUS EMISSION MONITORING REQUIREMENTS AND ASSOCIATED EMISSION LIMITS

The Permittee shall comply with the CEM requirements as set forth in RCSA Section 22a-174-4. CEM shall be required for the following pollutant/operational parameters and enforced on the following basis:

<u>Pollutant/Operational Parameter</u>	<u>Averaging Times</u>	<u>Emission Limit</u>
NOx	24 hour block	0.323 lb/MMBTU
O <sub>2</sub>	1 hour block	

#### PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

##### A. Monitoring

1. The Permittee shall continuously monitor fuel consumption using a fuel meter.
2. The Permittee shall continuously monitor and continuously record the SCR aqueous ammonia injection rate (lb/hr or gal/hr), operating temperature (°F) and the pressure drop (inches of water) across the catalyst bed. The Permittee shall maintain these parameters within the ranges recommended by the manufacturer to achieve compliance with the emission limits in this permit.
3. The Permittee shall continuously monitor and continuously record the oxidation catalyst inlet temperature (°F). The Permittee shall maintain this parameter within the ranges recommended by the manufacturer to achieve compliance with the emission limits in this permit.
4. The Permittee shall perform inspections of the control devices as recommended by the manufacturer.

##### B. Record Keeping

1. The Permittee shall keep records of monthly and consecutive 12 month fuel consumption. The consecutive 12 month fuel consumption shall be determined by adding the current month's fuel consumption to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

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#### PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS, cont.

2. The Permittee shall keep records of the fuel certification for each delivery of fuel oil from a bulk petroleum provider or a copy of the current contract with the fuel supplier supplying the fuel used by the equipment that includes the applicable sulfur content of the fuel as a condition of each shipment. The shipping receipt or contract shall include the date of delivery, the name of the fuel supplier, type of fuel delivered, the percentage of sulfur in such fuel, by weight, dry basis, and the method used to determine the sulfur content of such fuel.
3. The Permittee shall calculate and record the monthly and consecutive 12 month PM<sub>10</sub>/PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and VOC emissions in units of tons. The consecutive 12 month emissions shall be determined by adding (for each pollutant) the current month's emissions to that of the previous 11 months. Such records shall include a sample calculation for each pollutant. The Permittee shall make these calculations within 30 days of the end of the previous month.

Emissions during startup and shutdown shall be counted towards the annual emission limitation in Part VI.C of this permit.

4. The Permittee shall calculate and record the NO<sub>x</sub> emissions from permits 117-0204 through 117-0210, inclusively.
5. The Permittee shall keep records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of this equipment; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative. [40 CFR §60.7(b)]

Such records shall contain the following information:

- a. type of event (startup, shutdown, or malfunction),
  - b. equipment affected,
  - c. date of event,
  - d. duration of event (minutes),
  - e. fuel being used during event, and
  - f. total NO<sub>x</sub> emissions emitted (lb) during the event.
6. The Permittee shall keep records of each delivery of aqueous ammonia. The records shall include the date of delivery, the name of the supplier, the quantity of aqueous ammonia delivered, and the percentage of ammonia in solution, by weight.

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**PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS,  
cont.**

- 7. The Permittee shall keep records of the inspection and maintenance of the engine, SCR and oxidation catalyst. The records shall include the name of the person, the date, the results or actions and the date the catalyst is replaced.
- 8. The Permittee shall keep all records required by this permit for a period of no less than five years and shall submit such records to the commissioner upon request.

**PART V. OPERATION AND MAINTENANCE REQUIREMENTS**

- A. The Permittee shall operate and maintain this equipment in accordance with the manufacturer's specifications and written recommendations.
- B. The Permittee shall properly operate the control equipment at all times that this equipment is in operation and emitting air pollutants.

**PART VI. ALLOWABLE EMISSION LIMITS**

The Permittee shall not cause or allow this equipment to exceed the emission limits stated herein. The short term emission limits do not apply during periods of startup, shutdown and routine maintenance, unless otherwise noted.

**A. Emission Limits**

<u>Criteria</u>	<u>lb/hr</u>	<u>tons per 12</u>
<u>Pollutants</u>		<u>consecutive months</u>
PM-10/PM-2.5	1.46	1.70
SOx	0.85	1.06
NOx	5.30	6.63
VOC/HC	0.25	0.32
CO	1.01	1.26
<u>Non-Criteria</u>		
<u>Pollutant</u>	<u>ppmvd @15% O<sub>2</sub></u>	
Ammonia	10	

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#### PART VI. ALLOWABLE EMISSION LIMITS, continued

##### B. Startup and Shutdown

The Permittee shall minimize emissions during periods of startup and shutdown by the following work practices and time constraints. Start the ammonia injection as soon as minimum catalyst temperature is reached. The oxidation catalyst will not be bypassed during startup or shutdown. The duration of startup shall not exceed 60 minutes for a hot start or a warm start, nor 240 minutes for a cold start. A hot start shall be defined as startup when the turbine has been down for less than 8 hours. A warm start shall be defined as startup when the turbine has been down for more than 8 hours. A cold start shall be defined as startup when the turbine has been down for more than 24 hours. The duration of shutdown shall not exceed 30 minutes. Emissions during these periods shall be counted towards the annual emission limits stated herein.

- C. Hazardous Air Pollutants:** This unit shall not cause an exceedance of the Maximum Allowable Stack Concentration (MASC) for any hazardous air pollutant (HAP) listed in RCSA Section 22a-174-29. [**STATE ONLY REQUIREMENT**]

Demonstration of compliance with the above emission limits shall be met by calculating the emission rates using emission factors from the following sources:

1. NO<sub>x</sub>: Most current CEM data.
2. PM-10/PM-2.5, CO, Ammonia: Most current DEP approved stack test data.
3. VOC/HC: Manufacturer's data.
4. SO<sub>2</sub>, HAPs: Compilation of Air Pollutant Emission Factors, AP-42, fifth edition, Section 3.4, October 1996.

The commissioner may require other means (e.g. stack testing) to demonstrate compliance with the above emission limits, as allowed by state or federal statute, law or regulation.

#### PART VII. SPECIAL REQUIREMENTS

- A. STATE ONLY REQUIREMENT:** The Permittee shall operate this facility at all times in a manner so as not to violate or contribute significantly to the violation of any applicable state noise control regulations, as set forth in RCSA §§22a-69-1 through 22a-69-7.4.
- B.** Total annual NO<sub>x</sub> emissions from permits 117-0204 through 117-0210, inclusively, shall not exceed 121.5 tons per year.

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**PERMIT FOR FUEL BURNING EQUIPMENT****DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION  
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- A.** This permit does not relieve the Permittee of the responsibility to conduct, maintain and operate the regulated activity in compliance with all applicable requirements of any federal, municipal or other state agency. Nothing in this permit shall relieve the Permittee of other obligations under applicable federal, state and local law.
- B.** Any representative of the DEP may enter the Permittee's site in accordance with constitutional limitations at all reasonable times without prior notice, for the purposes of inspecting, monitoring and enforcing the terms and conditions of this permit and applicable state law.
- C.** This permit may be revoked, suspended, modified or transferred in accordance with applicable law.
- D.** This permit is subject to and in no way derogates from any present or future property rights or other rights or powers of the State of Connecticut and conveys no property rights in real estate or material, nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the facility or regulated activity affected thereby. This permit shall neither create nor affect any rights of persons or municipalities who are not parties to this permit.
- E.** Any document, including any notice, which is required to be submitted to the commissioner under this permit shall be signed by a duly authorized representative of the Permittee and by the person who is responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under section 22a-175 of the Connecticut General Statutes, under section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute."

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**PART VIII. ADDITIONAL TERMS AND CONDITIONS, continued**

- F.** Nothing in this permit shall affect the commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for violations of law, including but not limited to violations of this or any other permit issued to the Permittee by the commissioner.
- G.** Within 15 days of the date the Permittee becomes aware of a change in any information submitted to the commissioner under this permit, or that any such information was inaccurate or misleading or that any relevant information was omitted, the Permittee shall submit the correct or omitted information to the commissioner.
- H.** The date of submission to the commissioner of any document required by this permit shall be the date such document is received by the commissioner. The date of any notice by the commissioner under this permit, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three days after it is mailed by the commissioner, whichever is earlier. Except as otherwise specified in this permit, the word "day" means calendar day. Any document or action which is required by this permit to be submitted or performed by a date which falls on a Saturday, Sunday or legal holiday shall be submitted or performed by the next business day thereafter.
- I.** Any document required to be submitted to the commissioner under this permit shall, unless otherwise specified in writing by the commissioner, be directed to: Office of Director; Engineering & Enforcement Division; Bureau of Air Management; Department of Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.

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