



STATE OF CONNECTICUT
DEPARTMENT OF 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:	2 Whitney Avenue, 5 th Floor, New Haven, CT 06520
Equipment Location:	120 Tower Parkway, New Haven, CT 06520
Equipment Description:	Boiler No.5, 121.4 MMBtu/hr Nebraska Steam Boiler
Collateral Conditions:	This permit contains collateral conditions which apply to two Nebraska boilers (permit nos. 117-0371 and 117-0372).

Town-Permit Numbers:	117-0371
Town-Premises Numbers:	117-48
Prior Permit Issue Date:	November 18, 2009
Permit Issue Date:	August 24, 2012
Expiration Date:	N/A

/s/ Anne Gobin for
Daniel C. Esty
Commissioner

August 24, 2012
Date

PERMIT FOR FUEL BURNING EQUIPMENT

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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 is installing two boilers at the Central Power Plant facility in New Haven. This permit covers Boiler 5, as it is designated at the facility, and the other, Boiler 6, is covered under permit #117-0372. Boiler 5 is equipped with low NOx burners and will utilize up to 30% flue gas recirculation as a means of reducing NOx emissions. The 121.4 MMBtu/hr boiler fires natural gas as its primary fuel and distillate oil as back-up. Boiler 5 is capable of generating 100,000 lb/hr of saturated steam @ 250 psig. The boiler will be used to provide supplementary steam when the existing cogeneration units are offline and also when the facility experiences critical periods of high steam demand.

B. Equipment Design Specifications

1. Fuel Type(s): Natural Gas and distillate oil*
2. Maximum Fuel Firing Rate(s): 121,400 cf/hr and 851.7 gal/hr
3. Maximum Gross Heat Input (MMBTU/hr): 121.4(gas) and 115.4(oil)

*The use of a Biodiesel blend (B5) is allowed as an alternative to distillate oil.

C. Control Equipment Design Specifications

1. Low NOx Burner
 - a. Make and Model: CB-NATCOM or equivalent
 - b. Guaranteed NOx Emission Rate (lb/MM BTU)*: 0.011 (gas) and 0.10 distillate oil

*Emission guarantees apply during operation of the boiler at >25% of maximum rated capacity.

D. Stack Parameters

1. Minimum Stack Height (ft): 150
2. Minimum Exhaust Gas Flow Rate (acfm): 91,194*
3. Stack Exit Temperature (°F): 329
4. Minimum Distance from Stack to Property Line (ft): 24

*This exhaust flow rate is the combined flow for Boilers 4, 5 and 6 located at the Yale University Central Power Plant facility.

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PART II OPERATIONAL CONDITIONS

A. Equipment

1. Maximum Fuel Consumption over any Consecutive 12 Month Period*:
2,127 MMBtu/yr (gas) and 1,471.74 Mgal/yr (oil)
2. Maximum Fuel Sulfur Content (% by weight, dry basis): 0.0015%

* Maximum fuel consumption is for two boilers combined (permit #117-0371 and #117-0372)

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 Limit¹</u>	<u>Units</u>
NOx	24 hour block	11.54 (oil) ² , 1.34 (gas) ²	lb/hr
NOx	24 hour block	0.10 (oil) ³ , 0.011 (gas) ³	lb/MMBtu
O ₂	1 hour block		

¹Emission limits are for each individual boiler.

²Applies during all periods of operation including start-up and shutdown.

³Applies only during periods of operation at >25% of maximum rated capacity.

PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

A. Monitoring

1. The Permittee shall use a non-resettable totalizing fuel metering device to continuously monitor fuel feed to this permitted source.
2. The Permittee shall install, calibrate, maintain and operate Continuous Emissions Monitoring System (CEMS) for measuring NO_x and O₂ emissions to demonstrate compliance with the emission limits in this permit.

B. Record Keeping

1. The Permittee shall record the monthly and consecutive 12 month fuel consumption. The consecutive 12 month fuel consumption shall be determined by adding (for each fuel) 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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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 this 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 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.
4. The Permittee shall make and maintain records of all tune-ups, repairs, replacement of parts and other maintenance.
5. The Permittee shall maintain all charts, electronically stored data and printed records produced by the continuous emissions monitoring system. The Permittee shall also maintain records of all performance evaluations, calibration checks and adjustment of the emissions monitor.

C. Reporting

1. The Permittee shall submit quarterly reports of an exceedance of an emission limit specified in PART VI of this permit and any malfunction of the CEMS. Such reports shall be submitted to the commissioner on or before January 30, April 30, July 30, and October 30 and shall include data for the three calendar month period ending the month before the due date of the report.
2. The Permittee shall make available to the commissioner, any and all records required by this permit, upon request.
3. The Permittee shall maintain records as required by 40 CFR 60 Subpart Db and all applicable reports shall be submitted to the Administrator and the commissioner.

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. Within four months of initial start-up of the boiler, the Permittee shall submit a compliance plan, in accordance with 22a-174-22(m), to the Bureau of Air Management's Enforcement Section.

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PART VI. ALLOWABLE EMISSION LIMITS

The Permittee shall not cause or allow this equipment to exceed the emission limits stated herein at any time:

A. Short Term Emission Limits¹

Natural Gas

	<u>lb/hr</u>
PM	0.92
PM-10/PM-2.5	0.92
SOx	0.07
NOx	1.34
VOC	0.67
CO	4.73

Oil

	<u>lb/hr</u>
PM	2.81
PM-10	1.96
PM-2.5	1.32
SOx	0.21
NOx	11.54
VOC	0.29
CO	9.23

B. Annual Emission Limits

Natural Gas and Oil Combined

	<u>Tons per 12 consecutive months²</u>
PM	9.8
PM-10	9.0
PM-2.5	8.4
SOx	0.8
NOx	20.6
VOC	5.8
CO	45.4

¹ lb/hr emission limits are for each individual boiler.

² tons per consecutive 12 months emission limits are for both boilers combined (#117-0371 & #117-0372).

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PART VI. ALLOWABLE EMISSION LIMITS, continued

- 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**]
- D. OPACITY:** This unit shall not exceed 10% opacity during any six minute block average as measured by 40 CFR 60, Appendix A, Reference Method 9.

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

1. NOx (all fuels): CEMS
2. CO (all fuels): Manufacturer's Data
3. PM/PM-10/PM-2.5, SOx, VOC (Natural Gas): AP-42, 5th Edition, Vol. 1, Table 1.4-2
4. PM/PM-10/PM-2.5 (oil): AP-42, 5th Edition, Vol. 1, Table 1.3-2 and 1.3-6
5. SOx, VOC (Natural Gas): AP-42, 5th Edition, Vol. 1, Table 1.4-2
6. SOx (oil): AP-42, 5th Edition, Vol. 1, Table 1.3-1
7. VOC (oil): AP-42, 5th Edition, Vol. 1, Table 1.3-3

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. STACK EMISSION TEST REQUIREMENTS (Applicable if -X- Checked)

Stack emission testing shall be performed in accordance with the Emission Test Guidelines available on the DEP website:

http://www.ct.gov/dep/cwp/view.asp?a=2684&q=322076&depNav_GID=1619.

Initial stack testing shall be required for the following pollutants:

- PM/PM-10/PM 2.5 SOx NOx CO VOC Opacity
- Other (HAPs): _____, _____,

Stack tests shall be conducted no later than 180 days following initial start-up of the boiler.

PART VIII. SPECIAL REQUIREMENTS

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- A. The Permittee shall comply with all applicable sections of the following New Source Performance Standard(s) at all times.

Title 40 CFR Part 60, Subparts Db and A

Copies of the Code of Federal Regulations (CFR) are available online at the U.S. Government Printing Office website.

- B. **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 Sections 22a-69-1 through 22a-69-7.4.

PART IX. ADDITIONAL TERMS AND CONDITIONS

- 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.

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PART IX. ADDITIONAL TERMS AND CONDITIONS, continued

- 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."
- 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;

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Bureau of Air Management; Department of Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.

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