



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	Norwalk Hospital Association
Address	34 Maple Street, Norwalk, CT 06856
Equipment Location	24 Stevens Street, Norwalk, CT 06856
Equipment Description	3MW Caterpillar Natural Gas-Fired Cogeneration Engine
Town-Permit Numbers	137-0164
Premises Number	003
Stack Number	03
Permit Issue Date	August 6, 2014
Expiration Date	None

/s/ Macky McCleary
Macky McCleary
Deputy Commissioner

8/6/14
Date

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

Norwalk Hospital Association owns and operates Norwalk Hospital, a general medical and surgical hospital located in Norwalk, Connecticut. Norwalk Hospital houses an energy generation and distribution center ("The Center") to supplement its power requirements. The Center currently consists of generators driven by a gas turbine (Permit No. 137-0052), two boilers (Permit Nos. 137-0053 and 137-0054) and a natural gas-fired, lean burn cogeneration engine with an electrical output of approximately 3 MW. All power and steam generated by the Center is supplied to the hospital.

The cogeneration engine will be equipped with a selective catalytic reduction system and an oxidation catalyst to control emissions. Lastly, emissions resulting from the operation of the aforementioned gas turbine, boilers and cogeneration engine will be exhausted through the same stack, Stack No. 3. This stack is equipped with Opacity, NO_x and O₂ CEMS, as required by Permit No. 137-0052, for the gas turbine.

B. Equipment Design Specifications

1. Make and Model : Caterpillar CG260-12
2. Maximum Fuel Firing Rate (s) (Mcf/hr) : 25.84
3. Maximum Gross Heat Input (MMBtu/hr) : 25.84

C. Control Equipment Design Specifications

1. Selective Catalytic Reduction (SCR)
 - a. Make and Model: Steuler DeNO_x-2032V12/3000 or Equivalent
 - b. Catalyst Type: BASF Catalyst 04-85 or Equivalent
 - c. Minimum Design NO_x Removal Efficiency (%): 88.3
 - d. Catalyst Bed Temperature Range (°F): 570 - 932
 - e. Maximum Pressure Drop across Catalyst/Mixer (inches of H₂O): 6.0
 - f. Maximum Urea Consumption Rate (gal/hr): 2.5
 - g. Urea Solution Concentration (% by weight): 40
2. Oxidation Catalyst
 - a. Make and Model: Steuler or Equivalent
 - b. Catalyst Type: Sud-Chemie EnviCat DOC-2500 CH or Equivalent
 - c. Minimum Design CO Removal Efficiency (%): 99.2
 - d. Minimum Design VOC Removal Efficiency (%): 86.8
 - e. Minimum Design HCHO Removal Efficiency (%): 84.9

D. Stack Parameters

- 1. Minimum Stack Height (ft): 115
- 2. Minimum Exhaust Gas Flow Rate (acfm): 12,987
- 3. Minimum Stack Exit Temperature (°F): 300
- 4. Minimum Distance from Stack to Property Line (ft): 175

PART II. OPERATIONAL CONDITIONS

A. Equipment

- 1. Fuel Type: Natural Gas
- 2. Maximum Fuel Consumption over any Consecutive 12 Month Period (MMcf): 226.4
- 3. Construction and operation of this unit shall not preclude the Permittee from complying with the applicable CEM requirements for the gas turbine (Permit No. 137-0052), as set forth in RCSA Section 22a-174-4 and 40 CFR Part 60 Subpart GG.

PART III. ALLOWABLE EMISSION LIMITS

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

A. Short Term Emission Limits

These short term emission limits do not apply during periods of startup and shutdown, unless otherwise noted.

- 1. Criteria Pollutants

Pollutant	lb/hr	gm/bhp-hr	lbs/MW-hr
PM	0.26		
PM ₁₀	0.26		
PM _{2.5}	0.26		
SO ₂	0.02		
NO _x	1.14	0.12	0.38
VOC	0.06	0.01	
CO	0.12	0.01	

- 2. Non-Criteria Pollutants

Pollutant	lb/hr	ppmvd @ 15% O₂
Acrolein	0.02	
Ammonia	0.12	
Formaldehyde	0.47	

B. Startup and Shutdown Emission Limits

1. NO_x startup and shutdown limit: 9.66 lb/hr.
2. CO startup and shutdown limit: 14.99 lb/hr.
3. VOC startup and shutdown limit: 0.43 lb/hr.
4. Startup and shutdown events, in aggregate, shall not exceed 100 hours over any calendar year.
5. The Permittee shall minimize emissions during periods of startup and shutdown by the following work practices and time constraints:
 - a. Start the urea solution injection as soon as minimum catalyst temperature is reached;
 - b. The oxidation catalyst shall not be bypassed during startup or shutdown;
 - c. The duration of startup shall not exceed 60 minutes;
 - d. The duration of shutdown shall not exceed 30 minutes; and
 - e. Emissions during these periods shall be counted towards the annual emission limits stated herein.

C. Annual Emission Limits

Pollutant	tons per 12 consecutive months
PM	1.13
PM ₁₀	1.13
PM _{2.5}	1.13
SO ₂	0.07
NO _x	5.40
VOC	0.27
CO	1.28

- D. Hazardous Air Pollutants:** This equipment shall not cause an exceedance of the Maximum Allowable Stack Concentration (MASC) for any hazardous air pollutant (HAP) emitted and listed in RCSA Section 22a-174-29. [STATE ONLY REQUIREMENT]
- E. Opacity:** Opacity resulting from operation of this engine shall not exceed 10% during any six-minute block average or 40% reduced to a one-minute block average; as measured by 40 CFR 60, Appendix A, Reference Method 9.
- F. Demonstration of compliance with the above emission limits shall be met by calculating the emission rates using emission factors from the following sources:**
- PM/PM₁₀/PM_{2.5}, SO₂, HAPs (except Formaldehyde, Acrolein and Ammonia): Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Section 3.2, August 2000
 - NO_x, VOC, CO, Formaldehyde, Ammonia: Manufacturer’s Data or Most Recent Stack Test Data
 - Acrolein: Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Section 3.2, August 2000 or Most Recent Stack Test Data

The Permittee is not required to demonstrate compliance with the short-term emission limits stated herein during the initial shakedown period. Emissions during the initial shakedown period shall be counted towards the annual emission limits stated herein. The shakedown period shall not extend beyond the required date for the initial performance tests.

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 IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

A. Monitoring

1. The Permittee shall continuously monitor fuel consumption using a non-resettable totalizing fuel meter.
2. The Permittee shall continuously monitor and continuously record the SCR urea solution 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 listed 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 listed 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 make and keep records of 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.
2. The Permittee shall calculate and record the monthly and consecutive 12 month PM₁₀, PM_{2.5}, SO₂, NO_x, VOC, and CO 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 emissions limitations listed in Part III.C of this permit.

3. The Permittee shall make and 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_x, VOC, and CO emissions emitted (lb) during the event.
4. The Permittee shall make and keep records of the daily and every 8760 hours of operation.
 5. The Permittee shall also make and keep records of the duration of startup and shutdown events, in aggregate, demonstrating compliance with Parts III.B.4 and B.5 of this permit.
 6. The Permittee shall make and keep records of each delivery of urea solution. The records shall include:
 - a. the date of delivery;
 - b. the name of the supplier;
 - c. the quantity of urea solution delivered; and
 - d. the percentage of urea in solution, by weight.
 7. The Permittee shall make and keep records of the inspection and maintenance of the engine, SCR and oxidation catalyst. The records shall include:
 - a. the name of the person;
 - b. the date;
 - c. the results or actions; and
 - d. the date the catalysts are 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.

C. Reporting

1. The Permittee shall comply with all applicable reporting requirements of RCSA Section 22a-174-22(l).
2. The Permittee shall notify the commissioner in writing of any malfunction of the engine, the air pollution control equipment or the continuous monitoring system. The Permittee shall submit such notification within ten days of the malfunction. The notification shall include the following:
 - a. a description of the malfunction and a description of the circumstances surrounding the cause or likely cause of such malfunction; and
 - b. a description of all corrective actions and preventive measures taken and/or planned with respect to such malfunction and the dates of such actions and measures.

3. The commissioner may request additional reporting to demonstrate compliance with the requirements of this permit, as allowed by state or federal statute, law or regulation.
4. The Permittee shall notify the commissioner, in writing, of the date of commencement of construction and the date of initial startup of this equipment. Such written notifications shall be submitted no later than 30 days after the subject event.

PART V. STACK EMISSION TEST REQUIREMENTS

Emission testing of this unit shall be performed in accordance with the [Emission Test Guidelines](#) available on the DEEP website.

A. Initial emission testing shall be required for the following pollutant(s):

- PM PM₁₀ PM_{2.5} SO₂ NO_x CO
 VOC Opacity Other (HAPs): Acrolein, Ammonia and Formaldehyde

The Permittee shall conduct initial testing within 60 days of achieving the maximum production rate, but not later than 180 days after initial startup. The Permittee shall submit test results within 60 days after completion of testing.

- B. For testing being conducted pursuant to 40 CFR Part 60, the test report shall be submitted within 180 days after the initial startup date or within 60 days after reaching maximum production rate. [40 CFR §60.8(a)]
- C. Recurrent emission testing for NO_x, CO and VOC shall be conducted every three years or every 8,760 hours of operation, whichever comes first.
- D. Recurrent emission testing for Acrolein, Ammonia and Formaldehyde shall be conducted within five years from the date of the previous test of such pollutants from this unit.
- E. Test results shall be reported as follows: all pollutants in units of lb/hr; NO_x, VOC, and CO in units of g/hp-hr or ppmvd at 15% O₂; HAPs in units of µg/m³ and ppmvd at 15% O₂.

PART VI. 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 operate and maintain this equipment, any air pollution control equipment, and any monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown and malfunction.
- C. The Permittee shall properly operate the control equipment at all times that this equipment is in operation and emitting air pollutants.

PART VII. SPECIAL REQUIREMENTS

- 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: JJJJ and A

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

- B.** The Permittee shall comply with all applicable sections of the following National Emission Standards for Hazardous Air Pollutants at all times.

Title 40 CFR Part 63, Subpart: ZZZZ and A

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

- C.** In the event that a malfunction causing either an emission exceedance or a parameter monitored out of recommended range is not corrected within three hours, the Permittee shall immediately institute shutdown of the engine.

- D.** 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. [STATE ONLY REQUIREMENT]

PART VIII. 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 DEEP 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."
- 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 Energy and Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.