



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	GenConn Middletown LLC/Middletown Power LLC
Address	P.O. Box 1001, Middletown, CT 06457
Equipment Location	1866 River Road, Middletown, CT 06457
Equipment Description	50 MW General Electric LM6000PC Combustion Turbine (Unit 13)
Town-Permit Numbers	104-0145
Premises Number	24
Stack Number	9
Prior Permit Issue Date	January 17, 2013 (Minor Modification) August 29, 2011 (Minor Modification) June 6, 2009 (Revision) August 27, 2008 (Permit to Construct & Operate)
Modification Issue Date	January 16, 2018
Expiration Date	None

/s/ Anne Gobin for
Robert J. Klee
Commissioner

January 16, 2018
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

Middletown Power LLC operates four identical General Electric LM6000PC peaking power combustion turbines at the Middletown Power LLC generating plant. The four units are rated at a nominal output of 50 MW each and can fire both natural gas and ultra-low sulfur distillate (ULSD) fuel oil.

B. Equipment Design Specifications

1. Turbine
 - a. Maximum Fuel Firing Rates: 498,000 scf/hr (gas); 3,600 gal/hr (oil)
 - b. Maximum Gross Heat Input (MMBtu/hr): 510.9 (gas); 482.4 (oil)

C. Control Equipment Design Specifications

1. Selective Catalytic Reduction (SCR)
 - a. Make and Model: Express Integrated Technologies
 - b. Catalyst Type: Honeycomb
2. Water Injection (gas and oil firing)

The above NO_x controls will have a guaranteed NO_x emission rate of 2.5 ppmvd (gas) and 5.9 ppmvd (oil) at 15% O₂

3. Oxidation Catalyst
 - a. Make and Model: Express Integrated Technologies
 - b. Catalyst Type: Honeycomb

D. Stack Parameters

1. Minimum Stack Height (ft): 213
2. Minimum Stack Diameter (ft): 12
3. Minimum Exhaust Gas Flow Rate at 100% load (acfm): 577,309 (gas); 577,491 (oil)
4. Minimum Stack Exit Temperature at 100% load (°F): 677 (gas); 688 (oil)
5. Minimum Distance from Stack to Property Line (ft): 125

PART II. OPERATIONAL CONDITIONS

A. Equipment

1. Turbine
 - a. Fuel Types: Natural Gas; Distillate Fuel Oil (ULSD)
 - b. Maximum Fuel Consumption over any Consecutive 12 Month Period**:
2,312 x 10⁶ scf (gas); 8,363 x 10³ gallons (oil)

**** Note: Fuel limitation is the maximum annual natural gas and/or distillate oil to be combusted in this unit as well as the additional units operating in accordance with Permit Nos. 104-0144, 104-0146 and 104-0147.**

The Permittee shall use the following equation to determine the maximum amount of fuel available to be burned in this turbine, as well as the additional units operating in accordance with Permit Nos. 104-0144, 104-0146 and 104-0147 to comply with the emission limits in Part III of this permit.

$$\text{Maximum Natural Gas Use} = \text{Fuel}_{\text{ng}} - (276.45) \times \text{Fuel}_{\text{oil}}$$

Where: Fuel_{ng} = $2,312 \times 10^6$ scf natural gas

Fuel_{oil} = gallons of distillate fuel oil burned; not to exceed $8,363 \times 10^3$ gal/yr

- c. Maximum Distillate Fuel Oil Sulfur Content (% by weight): 0.0015

PART III. ALLOWABLE EMISSION LIMITS

The Permittee shall not cause or allow this equipment to exceed the emission limits stated herein at any time, as determined in accordance with the applicable averaging periods defined in Part III of this permit or as specified in an approved stack test protocol.

A. Steady State (50%-100% Load) at ISO conditions

1. Criteria Pollutants

a. Natural Gas Firing:

Pollutant	lb/hr	ppmvd @ 15% O ₂
PM ₁₀	6.0	
PM _{2.5}	6.0	
SO ₂	0.26	
NO _x	4.4	2.5
VOC	1.11	
CO	5.3	5.0

b. Distillate Fuel Oil Firing:

Pollutant	lb/hr	ppmvd @ 15% O ₂
PM ₁₀	12.0	
PM _{2.5}	12.0	
SO ₂	0.70	
NO _x	10.5	5.9
VOC	0.75	
CO	1.1	1.0
Pb	6.4E-3	

2. Non-Criteria Pollutants

For All Operating Scenarios:

Pollutant	ppmvd @ 15% O ₂
Ammonia	5.0

3. Maximum Allowable Annual Emissions: Emission limits are combined worst case for each pollutant for this unit as well as the additional units operating in accordance with Permit Nos. 104-0144, 104-0146 and 104-0147, using either natural gas or distillate fuel oil or a combination thereof:

Pollutant	Tons/year
PM ₁₀	14.9
PM _{2.5}	14.9
SO ₂	0.9
NO _x	10.8
VOC	2.8
CO	19.9
Pb	7.94E-3

B. Startup and Shutdown Operation

1. 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 and malfunctions shall not exceed 60 minutes; and
 - The duration of shutdown shall not exceed 30 minutes.

2. NO_x and CO Emissions:

Pollutant	Startup (lb/event)	Shutdown (lb/event)
Gas Firing		
NO _x	20	13
CO	32	27
Oil Firing		
NO _x	40	25
CO	18	9

3. Emissions during these periods shall be counted towards the annual emission limits stated herein.

C. 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 §22a-174-29. [STATE ONLY REQUIREMENT]

D. Opacity

This equipment shall not exceed 10% opacity during any six minute block average as measured by 40 CFR Part 60, Appendix A, Reference Method 9.

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

- PM_{10/2.5}, NO_x, CO, Ammonia: Most recent stack test data
- NO_x, CO startup/shutdown emission rates: Manufacturer's Data
- SO_x: Calculated from 0.0015% S or less in distillate fuel oil
- VOC and Pb: AP-42 Chapter 3, Fifth Edition, Volume 1, Table 3.1-2a, dated 04/00

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 comply with the monitoring requirements as set forth in RCSA §22a-174-4, RCSA §22a-174-22, RCSA §22a-174-22e, 40 CFR Part 60 Subpart KKKK and 40 CFR Parts 72-78, if applicable.
2. The Permittee shall continuously monitor for the following operational parameters which will be enforced on the following basis:

Operational Parameter	Averaging Times	Parameter Limit	Units
Water-to-Fuel ratio	Hourly	0.480 – 1.602	lb/lb
Fuel Consumption	Continuous		gal/hr (oil) scf/hr (gas)

3. The Permittee shall use individual totalizing fuel metering devices or billing meters to continuously monitor fuel feed to the turbine.
4. The Permittee shall continuously monitor and continuously record the SCR ammonia injection rate (lb/hr), operating temperature (°F) and 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.
5. The Permittee shall continuously monitor and continuously record the oxidation catalyst inlet temperature (°F). The Permittee shall maintain this parameter within the range recommended by the manufacturer to achieve compliance with the emission limits in this permit.
6. The Permittee shall perform inspections of the SCR and oxidation catalysts as recommended by the manufacturer.

B. Record Keeping

1. The Permittee shall keep records of monthly and consecutive 12 month fuel consumption for this turbine and all four turbines operating under Permit Nos. 104-0144, 104-0145, 104-0146, and 104-0147, combined (for each fuel). 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 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 $PM_{10/2.5}$, SO_2 , 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 emission limitation in Part III of this permit.

4. The Permittee shall keep records of all exceedances of any operating parameter. Such records shall include:
 - a. the date and time of the exceedance;
 - b. a detailed description of the exceedance; and
 - c. the duration of the exceedance.
5. The Permittee shall keep records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the stationary gas turbine; any malfunction of the air pollution control equipment; or any periods during which a 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 and CO emissions emitted (lb) during the event.
6. The Permittee shall keep records of each delivery of aqueous ammonia. The records shall include:
 - a. the date of delivery;
 - b. the name of the supplier;
 - c. the quantity of aqueous ammonia delivered; and
 - d. the percentage of ammonia in solution, by weight.
 7. The Permittee shall keep records of the inspection and maintenance of the SCR and oxidation catalysts. The records shall include:
 - a. the name of the person;
 - b. the date;
 - c. the results or actions; and
 - d. the date the catalyst is replaced.
 8. The Permittee shall make and keep records pursuant to RCSA §22a-174-19a(i).

9. The Permittee shall keep records, when the turbine or gas generator is changed for routine maintenance, to include the following:
 - a. The date the turbine was changed;
 - b. The reason for the change;
 - c. Documentation that the replacement turbine or gas generator is the same make and model number; and
 - d. Documentation that the replacement turbine or gas generator does not result in an increase in emissions, the emission of any new air pollutants, or an increase in the electrical output of the unit.
10. 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 notify the commissioner in writing of any exceedance of an operating parameter, and shall identify the cause or likely cause of such exceedance, all corrective actions and preventive measures taken with respect thereto, and the dates of such actions and measures as follows:
 - a. For any hazardous air pollutant, no later than 24 hours after such exceedance commenced; and
 - b. For any other operating parameter, no later than ten days after such exceedance commenced.
2. The Permittee shall notify the commissioner in writing of any malfunction of the stationary gas turbine and the air pollution control equipment. 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 permittee shall submit all required reports to the commissioner as required pursuant to RCSA §22a-174-19a(j), RCSA §22a-174-22(l), RCSA §22a-174-22e, and 40 CFR §60.4375.

PART V. STACK EMISSION TEST REQUIREMENTS

- A. Stack emission testing shall be performed in accordance with the [Emission Test Guidelines](#) available on the DEEP website.
- B. Recurring stack testing shall be required for the following pollutants:
 NO_x CO Other (HAPs): Ammonia
- C. Recurrent stack testing for NO_x, CO and ammonia shall be conducted every five years. Such testing shall be performed within five years from the previous stack test.
- D. Stack test results shall be reported as follows: all pollutants in units of lb/hr, NO_x and CO in units of ppmvd at 15% O₂, ammonia 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, air pollution control equipment, and 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, except as allowed during startup/shutdown events in Part III.B.1 of this permit.
- D.** The Permittee shall immediately institute shutdown of the turbine in the event a malfunction cannot be corrected within three hours.

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, Subpart: KKKK 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 at all times.

Title 40 CFR Part 63, Subparts YYYY and A

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

- C.** The Permittee shall comply with all applicable requirements of the Federal Acid Rain Program codified in Title 40 CFR Parts 72-78, inclusive, by the deadlines set forth within the aforementioned regulation.
- 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.