



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	Lotus Danbury LMS100, LLC
Address	58 South Service Road, Suite 130, Melville, NY 11747
Equipment Location	100 Saw Mill Road, Danbury, CT 06810
Equipment Description	Jenbacher Type 624 H01 (4.3 MW Reciprocating Internal Combustion Engine)
Town-Permit Numbers	044-0201
Premises Number	328
Stack Number	3
Permit Issue Date	
Expiration Date	None

Michael Sullivan
Deputy Commissioner

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

Jenbacher Type 624 H01 engine to be operated year round, providing power to this facility and a nearby data center.

B. Equipment Design Specifications

1. Fuel Type(s): Natural gas
2. Maximum Fuel Firing Rate(s) (MCF/hr): 38.9
3. Maximum Gross Heat Input (MMBtu/hr): 39.64

C. Control Equipment Design Specifications

1. Selective Catalytic Reduction (SCR)
 - a. Minimum Design NO_x Removal Efficiency (%): 95.5
 - b. Ammonia Injection Rate at Maximum Rated Capacity (gal/hr): Optimal ammonia injection rate to be determined during initial stack test
2. Oxidation Catalyst
 - a. CO Removal Efficiency (%): 96.7
 - b. VOC Removal Efficiency (%): 86.0
 - c. Formaldehyde Removal Efficiency (%): 98.7
 - d. Acrolein Removal Efficiency (%): 91.8

D. Stack Parameters

1. Minimum Stack Height (ft): 45
2. Minimum Exhaust Gas Flow Rate (acfm): 23,536
3. Minimum Stack Exit Temperature (°F): 676
4. Minimum Distance from Stack to Property Line (ft): 217

PART II. OPERATIONAL CONDITIONS

A. Equipment

1. Fuel Type: Natural gas
2. Maximum Fuel Consumption over any Consecutive 12 Month Period (MMCF/yr): 340

PART III. 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 Limits

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

1. Criteria Pollutants

Pollutant	lb/hr	g/hp-hr
PM	0.51	0.035
PM ₁₀	0.51	0.035
PM _{2.5}	0.51	0.035
SO ₂	5.55e-2	
NO _x	0.73	0.05
VOC	0.88	0.06
CO	1.46	0.1

2. Non-Criteria Pollutants

Pollutant	lb/hr	ppmvd @ 15% O ₂	g/hp-hr	lb/MWh ¹
Ammonia		5.0		
Formaldehyde			0.004	
Acrolein	0.024			
GHG as CO _{2e}				1,328

¹ – based on gross energy output on a 12-month rolling average.

B. Startup or Shutdown Events

Pollutant	Startup or Shutdown Event Emission Rate (lb/hr)
NO _x	6.03
VOC	2.75
CO	16.11

1. The Permittee shall minimize emissions during periods of startup or shutdown by the following work practices and time constraints:
 - a. Start the ammonia 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	2.24
PM ₁₀	2.24
PM _{2.5}	2.24
SO ₂	0.24
NO _x	3.20
VOC	3.84
CO	6.40
GHG as CO ₂ e	20,307

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 Part 60, Appendix A, Reference Method 9.

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

- PM, PM₁₀, PM_{2.5}, NO_x, VOC, CO, Ammonia, Formaldehyde and Acrolein: Most recent stack test results
- GHG as CO₂e: Most recent stack test results (CO₂), Emission Factors from 40 CFR Part 98, Subpart C (NO₂ and CH₄), Material Balance Calculation (SF₆)
- SO₂: Mass balance based on 0.5 grains of sulfur per 100 scf of natural gas
- Other HAPs: Compilation of Air Pollutant Emission Factors, AP-42, fifth edition, Section 3.2, August 2000
- Startup or shutdown event emissions: In accordance with Part III.B of this permit

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 aqueous ammonia rate (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 monitor gross electrical output for the engine.
5. 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.
2. The Permittee shall calculate and record the monthly and consecutive 12 month PM₁₀, PM_{2.5}, SO₂, NO_x, VOC, CO and CO_{2e} 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.

NO_x, VOC and CO emissions during startup and shutdown events shall be calculated and counted towards the respective annual emission limitation in Part III.C of this permit.

3. The Permittee shall make and keep records of gross electrical output on a 12 month rolling basis.
4. 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).
5. The Permittee shall keep records of each delivery of aqueous ammonia/urea. The records shall include:
 - a. the date of delivery;
 - b. the name of the supplier;
 - c. the quantity of aqueous ammonia/urea delivered; and
 - d. the percentage of ammonia in solution, by weight.

6. The Permittee shall 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 catalyst is replaced.
7. 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 applicable reporting requirements of 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 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

- A. Stack emission testing shall be performed in accordance with the [Emission Test Guidelines](#) available on the DEEP website.
- B. Initial stack testing shall be required for the following pollutant(s):

<input checked="" type="checkbox"/> PM	<input checked="" type="checkbox"/> PM ₁₀	<input checked="" type="checkbox"/> PM _{2.5}	<input type="checkbox"/> SO ₂	<input checked="" type="checkbox"/> NO _x	<input checked="" type="checkbox"/> CO	<input checked="" type="checkbox"/> CO ₂
<input checked="" type="checkbox"/> VOC	<input type="checkbox"/> Opacity	<input checked="" type="checkbox"/> Other (HAPs): Acrolein, Ammonia, Formaldehyde				
- C. The Permittee shall conduct initial stack 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.
- D. 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)]
- E. Recurrent stack testing for NO_x, VOC, CO, CO₂ and Formaldehyde shall be conducted within five years from the date of the previous stack test.
- F. Stack test results shall be reported as follows: criteria pollutants, CO₂ and Acrolein in lb/hr, criteria pollutants (except SO₂) and Formaldehyde in g/hp-hr, 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 possess at least 41.78 tons of external emissions reductions to offset the quantity of NO_x emitted from the sources covered under the following permits to comply with RCSA §22a-174-3a(l):

Permit No. 044-0199 General Electric LMS100PA+ (112 MW Simple Cycle Turbine) Unit 1
Permit No. 044-0200 General Electric LMS100PA+ (112 MW Simple Cycle Turbine) Unit 2
Permit No. 044-0201 Jenbacher Type 624 H01 (4.3 MW Reciprocating Internal Combustion Engine)

This quantity is sufficient to offset NO_x emissions allowed under the listed permits at a ratio of 1.3 to 1. Specifically, the reductions will be real, quantifiable, surplus, permanent, and enforceable as defined in RCSA 22a-174-3a(l)(5). The Permittee shall maintain sole ownership and possession of these emissions reductions for the duration of this permit and any subsequent changes to the permit.

The required emissions offsets must be obtained by the Permittee and approved by the Department at or before issuance of the initial construction/operating permits listed above.

The Permittee may be required to obtain additional NO_x offsets and complete additional ambient air quality analysis to show that the NAAQS and PSD increments have not been violated if observed steady state or transient emissions exceed a limit specified in Parts III.A or B of this permit.

- B.** 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.

- 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.

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