onnecticut Department of

NERGY &
NVIRONMENTAL
ROTECTION

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	Wallingford Energy, LLC
Address	115 John Street, Wallingford, CT 06492
Equipment Location	115 John Street, Wallingford, CT 06492
Equipment Description	General Electric LM6000 Simple Cycle Jet Turbine 7
Town-Permit Numbers	189-0247
Premises Number	114
Stack Number	09
Permit Issue Date	
Expiration Date	None

Michael Sullivan
Deputy Commissioner

Date

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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

Wallingford Energy, LLC operates a nominally rated 350 megawatt (MW) simple cycle combustion turbine power plant in Wallingford, Connecticut. The facility consists of seven 50 MW General Electric LM6000 Simple Cycle Jet Turbines, one 33.475 MMBtu/hr Cleaver Brooks Boiler and one 560kW Black Start Diesel generator. The combustion turbines and boiler burn only natural gas.

Five of the seven Jet Turbines (NSR Permit Nos. 189-0194 through 189-0198) are equipped with low NO_x Burners, Water Injection and Selective Catalytic Reduction (SCR) Systems for the control of Nitrogen Oxide (NO_x) emissions, and Oxidation Catalysts for the control of Carbon Monoxide (CO), Volatile Organic Compounds (VOC) and Formaldehyde (HCHO) emissions. The remaining two Jet Turbines (NSR Permit Nos. 189-0246 and 189-0247) use Water Injection in conjunction with SCR Systems for the control of NO_x emissions, as well as, Oxidation Catalysts for the control of CO, VOC and HCHO emissions.

B. Equipment Design Specifications

1. Turbine
   a. Make and Model: General Electric LM6000 PC-SPRINT
   b. Maximum Fuel Firing Rate (Mcf/hr): 464
   c. Maximum Gross Heat Input (MMBTU/hr): 473

C. Control Equipment Design Specifications

1. The Permittee shall use Water Injection at a rate sufficient to maintain compliance with the applicable NO_x emission limits.

2. Selective Catalytic Reduction (SCR)
   a. Make and Model: Cormetech - MHT
   b. Minimum Design NO_x Removal Efficiency (%): 90
   c. Ammonia Injection Rate at Maximum Rated Capacity (gal/hr): 21

3. Oxidation Catalyst
   a. Make and Model: Engelhard - CAMET
   b. Minimum Design CO Removal Efficiency (%): 91.6
   c. Minimum Design VOC Removal Efficiency (%): 80
   d. Minimum Design HCHO Removal Efficiency (%): 50

D. Stack Parameters

1. Minimum Stack Height (ft): 100

2. Minimum Exhaust Gas Flow Rate at 100% load (acfm): 570,941

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3. Minimum Stack Exit Temperature at 100% load (°F): 762

4. Minimum Distance from Stack to Property Line (ft): 48

PART II. OPERATIONAL REQUIREMENTS

A. Operational Conditions

1. Turbine
   a. Allowable Fuel Type: Natural Gas
   b. Maximum Allowable Heat Rate at full operating load on a12-month rolling basis (Btu/kW-hr): 8,748
   c. Maximum Fuel Consumption over any Consecutive 12 Month Period (MMCF/yr): 1,856

B. Operation and Maintenance

1. The Permittee shall operate and maintain this equipment in accordance with the manufacturer's specifications and written recommendations.

2. 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.

3. The Permittee shall properly operate the control equipment at all times that this equipment is in operation and emitting air pollutants.

4. 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 turbine.

PART III. ALLOWABLE EMISSION LIMITS

The Permittee shall not cause or allow this equipment to exceed the emission limits stated herein at any time except as allowed in Part III.B of this permit.

A. Steady State Emissions

1. Criteria Pollutants

Pollutant	lb/hr	ppmvd @ 15% O_2	lb/MMBtu
PM/ PM_{10}	6.00		0.023
$PM_{2.5}$ (Filterable + Condensable)	6.00		0.023
SO_2	1.05		0.002
NO_x	4.29	2.5	
VOC	0.95	1.7	
CO	5.72	5.0	

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2. Non-Criteria Pollutants

Pollutant	lb/hr	ppmvd @ 15% O_2
Ammonia	3.17	5.0
Formaldehyde	0.17	
Sulfuric Acid	0.47	

B. Startup and Shutdown Events

1. Startup and Shutdown Emission Limits

In lieu of the lb/hr emission limits in Part III.A of this permit for NO_X, VOC and CO, the Permittee shall not cause or allow this equipment to exceed the emission limits stated herein at any time during startup and shutdown.

Startup and shutdown emission limits are averages based on one-hour monitored time periods in which startup and shutdown occurred.

Start-up shall be defined as that period of time from initiation of combustion firing until the unit reaches steady state operation. Shut-down shall be defined as that period of time from the initial lowering of turbine output until the point at which the combustion process has stopped.

Pollutant	Type of Event	
	Startup (lb/hr)	Shutdown (lb/hr)
NO_x	40	20
VOC	0.95	0.95
CO	32	54

2. The Permittee shall minimize emissions during periods of startup and 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 for a hot start;
   d. The duration of startup shall not exceed 60 minutes for a warm start;
   e. The duration of startup shall not exceed 180 minutes for a cold start;
   f. A warm start shall be defined as startup when the turbine has been down for more than 8 hours;
   g. A cold start shall be defined as startup when the turbine has been down for more than 48 hours; and
   h. The duration of shutdown shall not exceed 30 minutes.

3. Emissions during startup and shutdown shall be counted towards the annual emissions limits in Part III.C of this permit.

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C. Annual Emission Limits

Pollutant	tons per 12 consecutive months
PM/ PM_{10}	12.0
$PM_{2.5}$ (Filterable + Condensable)	12.0
SO_2	2.1
NO_x	8.6
VOC	1.9
CO	11.4

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. Greenhouse Gases

1. The Permittee shall not cause or allow this equipment to emit Greenhouse Gases in excess of 1,205 lb CO_2e per MWh of gross energy output on a 12-month rolling basis.

2. The Permittee shall not cause or allow this equipment to emit Greenhouse Gases in excess of 111,577 tons of CO_2e per 12-consecutive months.

F. Opacity

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

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

1. PM/ PM_{10}/ $PM_{2.5}$, Ammonia and Formaldehyde: Stack test results

2. NO_x and CO: CEM Data (in units of ppmvd@15% O_2) converted to lb/hr

3. SO_2: Manufacturer's Data (Sulfur Content = 0.8 grains/100 standard cubic feet)

4. VOC: Correlation of VOC emissions to CO emissions, as determined by a diagnostic stack test and CO CEM Data

5. Sulfuric Acid: Material Balance calculations which may assume that twenty-nine (29) percent of the sulfur in the fuel is converted to Sulfuric Acid (H_2SO_4)

6. GHG (in CO_2e): Material Balance, Monitoring data as outlined in Part IV.A.3 of this permit and 40 CFR Part 98, Tables A-1, C-2 and W-7

7. All HAPs (except Formaldehyde, Ammonia and Sulfuric Acid): Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Volume I, Section 3.1, April 2000

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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 comply with the CEM requirements set forth in RCSA Section 22a-174-4, RCSA Section 22a-174-22, 40 CFR 60 Subpart KKKK and 40 CFR Parts 72-78, as applicable. CEM shall be required for the following pollutant/operational parameters and enforced on the following basis:

Pollutant/Operational Parameter	Averaging Times	Emission Limit	Units
NO_x	1 hour block	2.5	ppmvd@15% O_2
CO	1 hour block	5.0	ppmvd@15% O_2
O_2	1 hour block		

Continuous emissions monitoring shall be required during all periods of operation, including periods of startup, shutdown, malfunctions or emergency conditions.

2. The Permittee shall use a non-resettable totalizing fuel metering device to continuously monitor fuel feed to the turbine.

3. The Permittee shall continuously monitor and continuously record the CO_2 emissions and gross electrical output for the turbine. CO_2 emissions shall be determined using the methodology listed in 40 CFR Part 75, Appendix G, Equation G-4.

4. The Permittee shall continuously monitor and continuously record the SCR aqueous ammonia injection rate (lb/hr) and ammonia slip (ppm). 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 perform inspections of the SCR and oxidation catalysts and replace them 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 PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, VOC, CO and GHG in CO_2e emissions in units of tons. The consecutive

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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 limitations in Part III.C of this permit.

3. The Permittee shall make and keep records sufficient to demonstrate compliance with the Greenhouse Gas emissions limit listed in Part III.E.2 of this permit. These records shall include but not be limited to:

   a. CO_2 emissions measured on a continuous basis as outlined in Part IV.A.3 of this permit;
   b. Methane (CH_4) and Nitrous Oxide (N_2O) emissions calculated using 40 CFR Part 98, Tables A-1 and C-2 emission factors;
   c. Estimated CH_4 fugitive emissions from the natural gas pipeline and associated components calculated using 40 CFR Part 98, Tables A-1 and W-7 emission factors; and
   d. Estimated Sulfur Hexafluoride (SF_6) fugitive emissions from the electrical circuit breakers determined using Material Balance calculations and 40 CFR Part 98, Table A-1 emission factors.

4. The Permittee shall make and keep records of the turbine's heat rate and gross electrical output on a 12-month rolling basis.

5. The Permittee shall keep records of excess emissions and monitor downtime, in accordance with 40 CFR Part 60.7(c) and 40 CFR Part 60.4380. Additionally, records of exceedances of any emission limitation or operating parameter shall include:
   a. The date and time of the exceedance;
   b. A detailed description of the exceedance; and
   c. The duration of the exceedance.

6. The Permittee shall keep all applicable records listed in 40 CFR Part 60.4365(a), demonstrating that the fuel combusted meets the specifications outlined in 40 CFR Part 60.4365(a). [40 CFR §60.4365)]

7. 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 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); and
   e. Total NO_x and CO emissions emitted (lb) during the event.

8. The Permittee shall keep records of the emissions of this turbine during the initial shakedown period. Emissions during shakedown shall be calculated using good engineering judgment and the best data and methodology available for estimating such

emissions. Emissions during shakedown shall be counted towards the annual emission limitation in Part III.C of this permit.

9. The Permittee shall keep records of manufacturer's specifications and written recommendations for the operation, inspection, and maintenance of the permitted equipment.

10. 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.

11. The Permittee shall keep records of the inspection and maintenance of the turbine and the SCR and oxidation catalysts. These records shall include, but not be limited to:
    a. The name of the person conducting the inspection;
    b. The date;
    c. The results or actions; and
    d. The date the catalyst is replaced.

12. The Permittee shall comply with all applicable record keeping requirements set forth in RCSA Section 22a-174-22 and 40 CFR Part 60 Subpart KKKK.

13. 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 emissions limitation or deviation of an operating parameter, and shall identify the cause or likely cause of such exceedance or deviation, 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 regulated air pollutant or operating parameter, no later than ten days after such exceedance or deviation commenced.

2. The Permittee shall submit reports of excess emissions and monitor downtime to the Administrator, in accordance with 40 CFR Part 60.7(c) and 40 CFR Part 60.4380. Excess emissions and monitor downtime, as defined in 40 CFR Part 60.4380(b), shall be reported for all periods of unit operation, including startup, shutdown and malfunction. All reports required under 40 CFR Part 60.7(c) shall be postmarked by the 30th day following the end of each 6-month period. [40 CFR §§60.4375, 60.4380 and 60.4395]

3. The Permittee shall notify the commissioner in writing of any malfunction of the stationary gas turbine, 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

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measures.

4. The Permittee shall furnish the commissioner all applicable notifications and reports as specified in RCSA Section 22a-174-4, RCSA Section 22a-174-19a, RCSA Section 22a-174-22(l) and RCSA Section 22a-174-22c.

5. The Permittee shall notify the commissioner, in writing, of the dates of commencement of construction, initial startup and commencement of commercial operation of this equipment. Such written notifications shall be submitted no later than 30 days after the subject event. Commencement of commercial operations shall mean the date when the unit is released to ISO-New England for dispatch.

PART V. STACK EMISSION TEST REQUIREMENTS

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

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

☒ PM ☒ PM_{10} ☒ $PM_{2.5}$ (Filterable + Condensable) ☐ SO_2 ☒ NO_x ☒ CO
☐ VOC ☐ Opacity ☒ Other (HAPs): Ammonia and Formaldehyde ☒ CO_2

B. 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.

C. The initial stack test for NO_x shall be performed using CEM in accordance with 40 CFR Part 60.4405.

D. The initial stack test for CO_2 shall be used to determine initial compliance with the 1,205 lb CO_2e per MWh of gross energy output emission limitation.

E. 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% O_2, Formaldehyde in units of $\mu g/m^3$, and Ammonia in units of ppmvd at 15% O_2 and $\mu g/m^3$.

PART VI. SPECIAL REQUIREMENTS

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

Title 40 CFR Part 60, Subparts KKKK, TTTT 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 requirements of the Federal Acid Rain Program codified in Title 40 CFR Parts 72-78, inclusive, by the deadlines set forth with the aforementioned regulation.

C. The Permittee shall not cause or permit the emission of any substance or combination of substances which creates or contributes to an odor beyond the property boundary of the premises that constitutes a nuisance as set forth in RCSA Section 22a-174-23. [STATE ONLY

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REQUIREMENT]

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 VII. 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

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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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