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	Pratt & Whitney, Division of United Technologies Corporation
Address	400 Main Street, East Hartford, CT 06108
Equipment Location	400 Main Street, East Hartford, CT 06108
Equipment Description	FT-8 Stationary Gas Turbine Cogeneration System
Town-Permit Numbers	053-0049
Premises Number	0009
Stack Number	107
Collateral Conditions	This permit contains collateral conditions affecting three registered boilers as specified in Parts VII.A.- C. of this permit.
Revision Issue Date	July 19, 2013
Prior Permit Issue Dates	July 19, 2006 September 8, 2004 August 2, 2002 February 15, 2001 July 28, 1995 October 10, 1991 – Permit to Construct
Expiration Date	None

/s/ Anne Gobin for
Daniel C. Esty
Commissioner

July 19, 2013
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

The FT-8 Stationary Gas Turbine Cogeneration System is a cogeneration cycle gas turbine plant used to produce both power and steam for use in heating and manufacturing process applications at Pratt & Whitney's East Hartford plant. It is also used for research and design purposes for engines manufactured at the plant.

B. Equipment Design Specifications

1. Fuel Types: Natural Gas (NG), Ultra-Low Sulfur Diesel (ULSD)
   * The Permittee shall be allowed to burn Jet A fuel within 90 days of the issuance of this permit.
2. Maximum Fuel Firing Rates: 359,000 ft^3/hr (NG), 2,473 gal/hr (ULSD)
3. Maximum Gross Heat Input (MMBTU/hr): 365.7 (NG), 332.6 (ULSD)

C. Control Equipment Design Specifications

1. Selective Catalytic Reduction (SCR)
   a. Make and Model: Cormetech
   b. Catalyst Type: Fixed bed ceramic honeycomb
   c. Inlet Temperature to Catalyst (°F): 500-760 (at ISO Standard Conditions)
   d. Reagent: Anhydrous Ammonia, Aqueous Ammonia or Urea
   e. Reagent Injection Rate at Maximum Rated Capacity: 21 lb/hr of ammonia (or equivalent)
   f. Design Removal Efficiency (%): 83.3% (at ISO Standard Condtions)
2. Water Injection
   a. Make and Model: TP&M Water Injection Skid
   b. Water to Fuel Ratio (lb/lb): 0.40 to 1.30
   c. Water Injection Rate on Natural Gas (lb/hr): 2,550-19,129
   d. Water Injection Rate on ULSD (lb/hr): 3,825 – 21,965

D. Stack Parameters

1. Minimum Stack Height (ft): 132
2. Minimum Exhaust Gas Flow Rate (acfm): 249,800
3. Minimum Stack Exit Temperature (°F): 437 (at ISO Standard Condtions)
4. Minimum Distance from Stack to Property Line (ft): 50

PART II. OPERATIONAL CONDITIONS

A. Equipment

1. Maximum Fuel Consumption over any Consecutive 12 Month Period: No restrictions on Natural Gas, 6,145,400 gallons (ULSD)
2. Maximum ULSD Sulfur Content (% by weight, dry basis): 0.0015

B. Start-up, Shutdown, and Malfunction Operation:

1. Start-up shall be defined as that period of time from which initiation of combustion turbine firing until the unit reaches steady-state operation. This period shall not exceed 60 minutes for a hot start, nor 180 minutes for a cold start. A cold start shall be defined as start-up when the turbine has been down for more than 24 hours.
2. Shutdown shall be defined as that period of time from the initial lowering of the turbine output to the cessation of turbine operation. This period shall not exceed 30 minutes.
3. Malfunction is defined in 40 CFR §60.2.
4. The hours of start-up and shutdown, in which NOx emissions exceed 9 ppmvd, shall not exceed 250 hours in any consecutive 12-month period.
5. During periods of start-up, shutdown, and malfunction, NOx emissions shall not exceed 50 ppmvd (corrected to 15% O2), based on the duration of the event (the minimum is a one-hour average).
6. During periods of start-up, shutdown, and malfunction, opacity shall not exceed 20% during any six-minute block average.

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. Pollutant Emission Limits

Pollutant	ppmvd @ 15% O_2	tpy
PM		12.53
PM_{10}		12.53
$PM_{2.5}$		12.53
SO_2		0.96
NOx	9.0*	42.62
VOC		3.36
CO		77.77
Pb		0.006
H_2SO_4		0.753
Ammonia	10.0	19.14

* This limit shall apply at all times except during start-up, shutdown, and malfunction as specified in Part II.B.5, above.

PART III. ALLOWABLE EMISSION LIMITS, continued

B. 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]

C. Opacity: Except as specified in Part II.B.6., this equipment 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:

- NOx, CO: Pratt & Whitney Power Systems emission test data for FT-8 turbines operating at base load or higher, as listed below:

Natural Gas Fired	lb/MMBTU
NOx (controlled)	0.0266
CO	0.049
ULSD Fired	
NOx (controlled)	0.0272
CO	0.024

- PM, SO_2, VOC, & PM (for all fuels): Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Table 3.1-2a, April 2000.
- H_2SO_4 (ULSD): CTDEEP emission factor of 2.45*S lb/1000 gal for liquid fuel, where S is the maximum percent sulfur content by weight.
- Ammonia: Calculation from 10 ppmvd.
- Hazardous Air Pollutants: Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Tables 3.1-3 to 5, pages 3.1-13 to 15, April 2000.

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 install, certify, maintain, operate, and quality-assure a CEM system consisting of NOx, O_2, and opacity monitors. The CEMS shall be installed, certified, maintained, and operated in accordance with 40 CFR §60.334(b) and RCSA Section 22a-174-4. CEM shall be required for the following pollutant/operational parameters and enforced on the following basis:

Pollutant/Operational Parameter	Averaging Times	Emission Limit	Units
Opacity	6 minute block	10	%
Opacity during start-up, shutdown, or malfunction	6 minute block	20	%
NOx	4 hour rolling	9.0	ppmvd @ 15% O_2
O_2	1 hour block		

a. All CEM equipment shall be operated in compliance with RCSA §22a-174-4. NOx data will be corrected to a dry basis and 15% O_2.
b. Continuous emissions monitoring shall be required during all periods of operation, including periods of start-up, shutdown, malfunctions, or emergency conditions.
c. The Permittee shall operate an opacity monitor to continuously monitor visible emissions during any period when ULSD is fired in the turbine.

2. The Permittee shall monitor the total sulfur content of all liquid fuel being fired in the turbine. The sulfur content of the fuel must be determined using the total sulfur methods described in 40 CFR §60.335(b)(10). [40 CFR §60.334(h)(1)] The sampling frequency shall be conducted as described in sections 2.2.3, 2.2.4.1, 2.2.4.2, and 2.2.4.3 of 40 CFR Part 75 Appendix D. [40 CFR §60.334(i)(1)] The fuel analyses required under 40 CFR §60.335(b)(10) may be performed by the Permittee, a service contractor retained by the Permittee, the fuel vendor, or any other qualified agency. [40 CFR §60.335(b)(11)]

3. The Permittee shall install and operate a continuous monitoring system to monitor and record the ammonia injection rate on an hourly basis.

4. The Permittee shall inspect the SCR catalyst once per year, at a minimum, and replace it as required through the monitoring of catalyst test pieces.

B. Record Keeping

1. The Permittee shall keep records of monthly and consecutive 12 month natural gas and ULSD 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 make and keep records of the sulfur content of each shipment of liquid fuel being fired in this turbine per Part VII.D. of this permit.

3. The Permittee shall keep records of the inspection of the SCR catalyst. The records shall include the name of the person inspecting the SCR catalyst, the date of inspection, the results of the inspection, and the date the catalyst is replaced.

4. The Permittee shall maintain records of the occurrence and duration of any start-up, 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)]

5. 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 review all recorded data daily. The Permittee shall notify the commissioner, in writing, of any deviation from an emissions limitation, and shall identify the cause or likely cause of such deviation, all corrective actions and preventative measures taken with respect thereto, and the dates of such actions and measures no later than ten (10) days after such deviation commenced.

PART IV. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS, continued

2. The Permittee shall submit reports of excess emissions and monitor downtime to the Administrator/commissioner, in accordance with 40 CFR §60.7(c). For the purpose of reports required under §60.7(c), periods of excess emissions that shall be reported are defined in 40 CFR §60.334(j). The Permittee shall meet this requirement by submitting the Quarterly Report to the commissioner.
3. The Permittee shall furnish the Administrator/commissioner written notification as required by 40 CFR §60.7(a).

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

C. The Permittee shall comply with the conditions of this permit when operating either production or R&D engines.

PART VI. SPECIAL REQUIREMENTS

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

Title 40 CFR Part 60, Subparts GG 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 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 REQUIREMENT]

C. 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. PREMISES-WIDE REQURIEMENTS

A. The Permittee shall burn an aggregate of no greater than 23,500,000 gallons per year of ULSD over any consecutive 12-month period in boilers 6, 8 & 9 (registration numbers 053-0039, -0041, and -0042) at the Pratt & Whitney, 400 Main Street, East Hartford, Connecticut plant. The Permittee shall operate the three boilers on fuels with a sulfur content of no greater than 0.0015%, dry weight basis.

B. The Permittee shall install, maintain, and operate fuel metering devices for the sources listed in Part VII.A. of this permit, unless natural gas utility meters are already used for that purpose.

PART VII. PREMISES-WIDE REQUREMENTS, continued

C. The Permittee shall make and keep records of the monthly and consecutive 12-month fuel usage for the sources listed in Part VII.A of this permit. The consecutive 12-month fuel usage shall be determined by adding the current month's fuel usage to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

D. The Permittee shall make and keep records of the sulfur content of each shipment of liquid fuel received at the 400 Main Street, East Hartford plant, either by (1) a shipping receipt and certification from the fuel supplier, or (2) performing an analysis using the method found in ASTM D4294, or (3) a copy of a current fuel supplier contract. Records for a fuel certification and analysis shall include the following information: 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. Records for a current contract shall include the following information: the name of the fuel supplier and type or grade of fuel delivered.

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 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.

PART VIII. ADDITIONAL TERMS AND CONDITIONS, continued

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.

NSR Engineering Evaluation

CT Department of Energy and Environmental Protection
Bureau of Air Management

Administrative Information
Date Application Received: 3/11/2013
SIMS No: 201301308

Applicant Information
Company Name: Pratt & Whitney, Division of UTC
Equipment Location: 400 Main Street, East Hartford, CT 06108
Mailing Address: 400 Main Street, Mail Stop 102-21, East Hartford, CT 06108
Contact Person: Mr. Steven Eitelman
Contact Title: Specialist, Environmental Health & Safety
Contact Phone Number: 860-565-7929
Contact E-mail: steven.eitelman@pw.utc.com

Evaluation Information
Date Prepared: 4/17/2013
Prepared By: Ms. Allison Tyropolis, amt

Permit Information
Permit No: 053-0049
Equipment Description: FT-8 Stationary Gas Turbine Cogeneration System

Choose a Permit Type:

- [x] Single Unit
- [ ] Multiple Units
- [ ] New NSR at a Major Source
- [ ] New NSR at a Minor Source
- [ ] Non-Minor Modification at a Major Source
- [ ] Non-Minor Modification at a Minor Source
- [ ] Minor Modification (prepaid in full)
- [ ] Minor Modification (app fee paid only)
- [x] Revision at a Major Source
- [ ] Revision at a Minor Source

Update Fields

Part I: Discussion

On July 28, 1995, Pratt & Whitney, Division of United Technologies Corporation (Pratt & Whitney) was issued a permit to operate for an FT-8 Stationary Gas Turbine Cogeneration System (NSR Permit No. 053-0049). A revision to the permit was issued on February 15, 2001 to conform to the NSPS Subpart GG method for determination of SO_2 emissions. A minor modification of the permit was issued on August 2, 2002 to increase the output of the turbine from 24.9 to 32 MW. A minor modification of the permit was issued on September 8, 2004 to correct the NOx and CO emission factors for the higher heating value. On July 19, 2006, a minor modification to the permit was issued to amend emission factors and rates, the heat input rate, the SCR control efficiency and operating parameters; to increase the fuel usage; and to remove collateral conditions from the permit.

On March 11, 2013, the Department received an application from Pratt & Whitney to revise NSR Permit No. 053-0049. They are proposing to change their allowable fuel type from Natural Gas and Jet Fuel A to Natural Gas and Ultra-Low Sulfur Diesel. Pratt & Whitney is requesting a revision pursuant to RCSA Section 22a-174-2a(f)(2)(G).

In doing so, the sulfur dioxide emissions from the FT-8 Stationary Gas Turbine Cogeneration System have been reduced from 42.39 to 0.96 TPY. Also, Part IV.A.1.d. has been removed from the permit. This permit condition required Pratt & Whitney, upon receipt of written notice from the commissioner, to install, operate, and maintain a CEM system for ammonia. Until the date of this revision, the commissioner has not required the installation of an ammonia CEM. There was not an enforcement reason to require CEM for ammonia and there have been no compliance issues with respect to the ammonia limitation. In the future, if an issue were to arise which would cause ammonia CEM to be required, Pratt & Whitney would need to modify the permit, as addional recordkeeping and reporting requirements would need to be incorporated to accommodate this additional montitoring requirement.

Since the turbine is required to be run during periods of emergency, the permit has allowed for Pratt & Whitney to burn Jet Fuel A for a period of 90 days after the issuance of this minor modification to ensure Pratt & Whitney is able to operate if necessary during their switch to a cleaner fuel.

Pursuant to RCSA Section 22a-174-2a(f)(3), the commissioner may revise a permit without published notice, public comment, or hearing. Therefore, no public notice has been recommended for this revision.

The Department of Environmental Protection's Compliance History Policy (CHP) requires a compliance history review for every applicant. The resources used to determine complianc with the CHP were: the SIMS Enforcement database and input from the Air Enforcement and Field Operations Section.

On April 22, 2013, The Air Enforcement and Field Operations Section indicated there are no enforcement related issues to delay or deny the issuance of the permit revision. A search of the SIMS Enforcement database also indicated that there are no open enforcement actions with other bureaus for Pratt & Whitney.

Since the requested changes qualify for a revision and Pratt & Whitney is converting to a cleaner fuel, and there are no enforcement related reasons why the revision should not occur, it is recommended that the revision of NSR Permit No. 053-0049 be granted.

/s/ Allison Tyroplos 7/3/13
Allison Tyropolis, APCE Date

Approvals:

/s/ Kiernan Wholean 7/3/13
Kiernan J. Wholean
Supervising APCE

/s/ Richard Pirolli 7/18/13
Richard A. Pirolli
Assistant Director

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