



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).

<b>Owner/Operator</b>	United States Naval Submarine Base New London
<b>Address</b>	439 Tautog Avenue, Room 104, Groton, CT 06349-5400
<b>Equipment Location</b>	Building 29, Lower Base, Route 12, Groton, CT 06349
<b>Equipment Description</b>	Cogeneration Facility Consisting of a 5 Megawatt Solar Taurus Turbine and Duct Burner Heat Recovery Steam Generator
<b>Town-Permit Numbers</b>	070-0096
<b>Premises Number</b>	28
<b>Stack Number</b>	10
<b>Prior Permit Issue Dates</b>	November 18, 2013 May 3, 2002 April 3, 1997
<b>Modification Issue Date</b>	July 21, 2016
<b>Expiration Date</b>	None

/s/ Anne Gobin for  
Robert J. Klee  
Commissioner

July 21, 2016  
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 United States Submarine Base New London operates a Solar Taurus 60 turbine and duct burner with a heat recovery steam generator 5 MW combined cycle cogenerator system which supplies electrical power and steam for the facility.

### **B. Equipment Design Specifications**

1. Maximum Natural Gas Firing Rate<sup>1</sup> (CF/hr): 102,300
2. Maximum No. 2 Oil Firing Rate<sup>1</sup> (gal/hr): 708
3. Maximum Gross Heat Input (MMBtu/hr)<sup>1</sup>: 102.3 (natural gas), 98.41 (No. 2 oil)

<sup>1</sup> at ISO conditions: 288 Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure

### **C. Control Equipment Design Specifications**

1. The cogeneration system shall be equipped with a Low NOx burner, CO catalyst, and water injection for the turbine.

### **D. Stack Parameters**

1. Minimum Stack Height (ft): 147 (bypass stack 52 feet in height shall be used during HRSG repair and maintenance only)
2. Minimum Exhaust Gas Flow Rate at 100% load (acfm): 4,620
3. Minimum Stack Exit Temperature at 100% load (°F): 315
4. Minimum Distance from Stack to Property Line (ft): 1,580

## **PART II. OPERATIONAL CONDITIONS**

### **A. Turbine and Duct Burner**

1. Fuel Types: Natural Gas, No. 2 Oil
2. Maximum No. 2 Oil Sulfur Content (% by weight, dry basis): 0.05
3. Maximum Fuel Consumption over any Consecutive 12-month Period (MMBtu/yr): 691,432<sup>2</sup>

<sup>2</sup> The turbine and duct burner shall be limited to a maximum annual heat input of 691,432 MMBtu. The following equation establishes the corresponding maximum fuel consumption while allowing the flexibility of burning natural gas and No. 2 oil:

$$(X \times (0.139 \text{ MMBtu/gal})) + (Y \times (0.001 \text{ MMBtu/ft}^3)) = 691,432 \text{ MMBtu}$$

where X = gallons of No. 2 oil,  $\leq 1.45$  million gallons  
Y = ft<sup>3</sup> of natural gas,  $\leq 691.43$  million ft<sup>3</sup>

Note: The United States Naval Submarine Base New London shall burn exclusively natural gas during the ozone season from May 1 through September 30, except during a curtailment period, facility maintenance, or times of war. A curtailment period is a period in which the gas supplier ceases to supply natural gas due to a limited supply or a mechanical breakdown in the natural gas supply system.

**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

a. Turbine Operating on Natural Gas

Pollutant	ppmvd @ 15% O <sub>2</sub>	lb/MMBtu
PM		0.014
PM <sub>10</sub>		0.014
PM <sub>2.5</sub>		0.014
SO <sub>2</sub>		0.001
NO <sub>x</sub>	25	0.090
VOC		0.030
CO		0.037

b. Turbine Operating on No. 2 Oil

Pollutant	ppmvd @ 15% O <sub>2</sub>	lb/MMBtu
PM		0.078
PM <sub>10</sub>		0.078
PM <sub>2.5</sub>		0.078
SO <sub>2</sub>		0.304
NO <sub>x</sub>	42	0.163
VOC		0.008
CO		0.090

c. Turbine and Duct Burner on Natural Gas (Duct burner cannot run independently)

Pollutant	lb/MMBtu	lb/hr
PM	0.010	5.90
PM <sub>10</sub>	0.010	5.90
PM <sub>2.5</sub>	0.010	5.90
SO <sub>2</sub>	0.001	30.70
NO <sub>x</sub>	0.100	14.76
VOC	0.035	3.74
CO	0.168	28.54

d. Turbine and Duct Burner on No. 2 Oil (Duct burner cannot run independently)

Pollutant	lb/MMBtu	lb/hr
PM	0.060	5.90
PM <sub>10</sub>	0.060	5.90
PM <sub>2.5</sub>	0.060	5.90
SO <sub>2</sub>	0.312	30.70
NO <sub>x</sub>	0.150	14.76
VOC	0.038	3.74
CO	0.290	28.54

2. Non-Criteria Pollutants

Pollutant	MASC (µg/m <sup>3</sup> )
Sulfuric Acid	285,000
Nickel	42,700
Formaldehyde	171,000
Lead	4,270
Vanadium	14,200
Sodium	569,000

**B. Annual Emission Limits**

Pollutant	Tons Per 12 Consecutive Months
PM	17.54
PM <sub>10</sub>	17.54
PM <sub>2.5</sub>	17.54
SO <sub>2</sub>	31.33
NO <sub>x</sub>	38.47
VOC	12.09
CO	57.20

**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 Section 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 may be met by calculating the emission rates using emission factors from the following sources:**

- *Manufacturer's Data*
- *Stack Test Results*

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 AND RECORD KEEPING REQUIREMENTS**

**A. Monitoring**

1. The Permittee shall comply with the CEM requirements as set forth in RCSA Section 22a-174-4. CEM shall be required for the following pollutant/operational parameters and enforced on the following basis:

<b>Pollutant/Operational Parameter</b>	<b>Averaging Times</b>	<b>Emission Limit</b>	<b>Units</b>
Water to Fuel Ratio	continuous	0.80:1.60	lb/lb

**B. Record Keeping**

1. The Permittee shall keep records of annual operating hours and fuel consumption. Annual operating hours and fuel consumption shall be based on any consecutive 12 month time period and shall be determined by adding (for each fuel) the current month's fuel usage and operating hours to that of the previous 11 months. The Permittee shall make these calculations monthly.
2. The Permittee shall use a fuel metering device to continuously monitor fuel feed to this permitted source.
3. Each oil fuel shipment for this equipment shall include a shipping receipt from the fuel supplier and a certification from the fuel supplier certifying the type of fuel in the shipment and the weight percent of sulfur in the fuel. The shipping receipt and/or certification shall include the name of the oil supplier, the sulfur content of the oil and the method used to determine the sulfur content of the oil. The Permittee shall maintain records of each shipping receipt and certification.

4. The Permittee shall keep records on the premises indicating continual compliance with all above conditions at all times and shall make them available upon request by the commissioner for the duration of this permit, or for the previous five years, whichever is less.

#### **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 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.

#### **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 Dc and Gg.

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

- B. 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 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.