

217/782-2113

CONSTRUCTION PERMIT -- NSPS SOURCE

PERMITTEE

Naval Training Center, Great Lakes
Attn: T. F. Bersson
201 Decatur Avenue, Building 1A
Great Lakes, Illinois 60088-2801

Application No.: 02110039

I.D. No.: 097811AAC

Applicant's Designation:

Date Received: November 18, 2002

Subject: Cogeneration Facility

Date Issued: May 19, 2003

Location: Building 11, Ziegemeir Street, Great Lakes

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a cogeneration facility with two turbines with associated heat recovery steam generators (HRSG) with duct burners, controlled with selective catalytic reduction (SCR), two backup engine-generators, and fuel oil storage tanks, which will replace three existing boilers in the central steam plant, as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

- 1a. Each turbine is subject to a New Source Performance Standard (NSPS) for stationary gas turbines, 40 CFR 60, Subparts A and GG. The duct burners in each HRSG are subject to NSPS Subparts A and Dc. The Illinois EPA is administering these NSPS in Illinois on behalf of the United States EPA under a delegation agreement.
- b.
 - i. Emissions of nitrogen oxide (NO_x) from each turbine shall not exceed the allowable limit pursuant to the NSPS, 40 CFR 60.332(a)(1).
 - ii. Each turbine shall comply with the applicable standard for sulfur dioxide pursuant to the NSPS, 40 CFR 60.333, e.g., the sulfur content of the fuel burned in the turbine shall not exceed 0.8 percent by weight.

Note: Conditions 3(b) and 4(a) establish more stringent requirements for the sulfur content of the oil.
- c. Emissions of sulfur dioxide (SO₂) from each duct burner shall not exceed the allowable limit pursuant to the NSPS, 40 CFR 60.41c.
- d. At all times, the Permittee shall maintain and operate the turbines and the duct burners in a manner consistent with good air pollution control practice for minimizing emissions, pursuant to the NSPS, 40 CFR 60.11(d).

- 2a. i. The sulfur content of oil fired in the turbines shall be within the level needed to comply with 35 IAC 214.161(b), pursuant to 35 IAC 214.304.

Note: Conditions 3(b) and 4(a) establish more stringent requirements for the sulfur content of the oil.

- ii. The emission of smoke or other particulate matter from each turbine or engine shall not have opacity greater than 30 percent, pursuant to 35 IAC 212.123(a), except as authorized in 35 IAC Part 201 Subpart I.
- iii. Emissions of carbon monoxide attributable to combustion of fuel by the duct burners in each HRSG shall not exceed 200 ppm corrected to 50% excess air pursuant to 35 IAC 216.121.
- b. i. During startup, the Permittee is authorized to operate the turbines in excess of opacity standard of 35 IAC 201.262, provided that all reasonable efforts are made to minimize startup emissions. This authorization only extends for a period of up to 20 minutes following initial firing of fuel during each startup event.
- ii. Each turbine shall be operated in a manner consistent with good air pollution control practice to minimize emissions associated with startup including the following. These practices shall be reviewed at least annually and enhanced consistent with good air pollution control practice based on actual operating experience and performance of the turbines.
 - A. The Permittee shall manage the operation of the turbines to provide adequate time for normal startup of the turbines.
 - B. The Permittee shall operate in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the Permittee.
 - C. The Permittee shall maintain the turbines in accordance with written procedures developed and maintained by the Permittee.

- 3a. Only natural gas and fuel oil may be fired in the cogeneration facility.
- b. The sulfur content of fuel oil used in the cogeneration facility shall not exceed 0.05 percent sulfur, by weight.
- c. The backup engine generators, combined, shall not operate for more than 4,000 hours per year (total 4,000 engine operating hours per year).
- d. i. Fuel oil usage in the turbines, combined, shall not exceed 710,000 gal/month and 8,529,000 gal/year.

- ii. Fuel oil usage in the duct burners, combined, shall not exceed 274,000 gal/month and 3,298,000 gal/year.
- iii. Fuel oil usage in the backup engines, combined shall not exceed 543,200 gallons/year.
- 4a. i. Emissions from the turbines, including the duct burners, shall not exceed the following limits, except during startup:

	<u>Gas Mode</u> <u>Lbs/Hour (Each)</u>	<u>Oil Mode</u> <u>Lbs/Hour (Each)</u>	<u>Tons/Year (Combined)</u>
NO _x	2.00	2.96	25.1
CO	11.63	12.09	99.0
SO ₂	0.30	5.26	41.9
VOM	0.41	0.41	3.5
PM	0.74	1.12	8.8

These limits are based on emission data in the application, including the maximum firing rate of a turbine and duct burners.

- ii. Emissions from the engine generators shall not exceed the following limits:

	<u>Lbs/Hour (Each)</u>	<u>Tons/Year (Combined)</u>
NO _x	8.49	17.00
CO	1.15	2.30
SO ₂	0.94	1.88
VOM	1.00	2.00
PM	0.47	0.94

- b. i. Annual emissions from the combustion units at the cogeneration facility in total shall not exceed the following limits. These limits address all emissions, including emissions during startup and shutdown.

	<u>Turbines (Tons/Year)</u>	<u>Total (Tons/Year)</u>
NO _x	25.1	42.1
CO	99.0	101.3
SO ₂	41.9	43.8
VOM	3.5	5.5
PM	8.8	9.74

- ii. Unless an alternative factor is established or emissions monitoring is performed, emissions of CO and VOM during a startup shall be presumed to be 120 percent of the limitations in Condition 4(a). For example, VOM emissions during a startup shall be assumed to be 0.90 pounds rather than 0.41 pounds as allowed for normal operation. Emissions of NO_x, SO₂, and PM₁₀

during an hour that includes a startup shall be presumed to be equal to emissions for one full hour of operation at 100% load. These presumptions are based on data in the application describing emissions during startup of a turbine and the subsequent shutdown. Any alternative factor for emissions during startup of a turbine shall be based on representative emission testing conducted with USEPA Reference Test Methods (see Condition 9(b)).

- c. This permit is issued based on negligible emissions of volatile organic materials from the storage tanks. For this purpose, emissions from the tanks shall not exceed nominal emission rates of 0.21 tons/year.
- 5a. This permit is issued based on the construction and operation of this facility not constituting a major modification subject to the federal rules for Prevention of Significant Deterioration of Air Quality, (PSD) 40 CFR 52.21 or the states rules for Major Stationary Sources Construction and Modification (MSSCAM), 35 IAC Part 201. For emissions of NO_x, CO, and SO₂ this determination relies upon contemporaneous decreases in NO_x, CO, and SO₂ emissions from other units such that the net changes in NO_x, CO, and SO₂ emissions from this project is not significant as shown in Tables I, II, and III when taken with creditable decreases.
- b. This permit is issued based on Boilers 1, 2 and 3 being permanently shut down and decommissioned in conjunction with construction of new units, which will be located where these boilers were previously located.
- 6. Compliance with annual limits set by this permit shall be determined from a running total of 12 months of data.
- 7a. The Permittee shall fulfill applicable notification and recordkeeping requirements of the NSPS, 40 CFR 60.7 for the construction and operation of the turbines. Notification shall be made in writing to the Illinois EPA and shall include the following:
 - i. Written notification of commencement of construction, no later than 30 days after such date (40 CFR 60.7(a)(1));
 - ii. Written notification of anticipated date of initial startup, at least 30 days but not more than 60 days prior to such date (40 CFR 60.7(a)(2); and
 - iii. Written notification of the actual date of initial startup, within 15 days after such date (40 CFR 60.7(a)(3)).
- b. The Permittee shall fulfill notification of the date of construction, anticipated startup, and actual startup of the duct burner, pursuant to 40 CFR 60.48c(a), which shall include:

- i. The design heat input capacity and identification of fuels to be combusted, pursuant to 40 CFR 60.48c(a)(1); and
 - ii. The annual capacity factor at which the Permittee anticipates operating the affected facility based on the fuel fired, pursuant to 40 CFR 60.48c(a)(3).
- 8a. Under this permit, the turbines and duct burners may be operated for a period of up to 180 days from initial startup to allow for equipment shakedown and emissions testing as required.
- b. Upon successful completion of the emission testing required by Condition 9(a) demonstrating compliance with applicable short-term limitations, the Permittee may continue to operate the facility as allowed by Section 39.5(5) of the Environmental Protection Act.
 - c. This condition supersedes Standard Condition 6.
- 9a. Within 60 days after achieving the maximum production rate at which the emission units will be operated but not later than 180 days after initial startup, the Permittee shall have emissions testing performed at its expense by a testing service approved by the Illinois EPA.
 - i. Each turbine/duct burners - NO_x
 - ii. One turbine/duct burners - CO and VOM
 - iii. One engine generator - NO_x, CO and VOM
- b. The following methods and procedures shall be used for testing of emissions:
 - i. USEPA Reference Test Methods shall be used for emission testing, including the following methods:

Carbon Monoxide	USEPA Method 10
Nitrogen Oxides	USEPA Method 7
Volatile Organic Material	USEPA Methods 18 and 25A
 - ii. Measurements for NO_x from the turbines/duct burners shall be conducted in accordance with 40 CFR 60.335, unless alternative testing procedures are approved by USEPA pursuant to 40 CFR 60.8(b).
 - c. At least 60 days prior to the actual date of testing, a written test plan shall be submitted to the Illinois EPA for review. This plan shall describe the specific procedures for testing and shall include as a minimum:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.

- ii. The specific conditions under which testing shall be performed including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the source will be tracked and recorded.
 - iii. The specific determinations of emissions and operation which are intended to be made, including sampling and monitoring locations.
 - iv. The test method(s) which will be used, with the specific analysis method, if the method can be used with different analysis methods.
- d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification for the expected date of testing shall be submitted a minimum of thirty (30) days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of five (5) working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe testing.
- e. Three copies of the Final Reports for these tests shall be forwarded to the Illinois EPA within 30 days after the test results are compiled and finalized. The Final Report from testing shall contain a minimum:
- i. A summary of results;
 - ii. General information;
 - iii. Description of test method(s), including a description of sampling points, sampling train, analysis equipment, and test schedule;
 - iv. Detailed description of test conditions, including:
 - A. Fuel consumption;
 - B. Turbine firing rate;
 - C. Duct burner firing rate;
 - D. SCR reagent injection rate and operating temperature; and
 - E. Turbine/steam turbine output rate.
 - v. Data and calculations, including copies of all raw data sheets and records of laboratory analysis, sample calculations, and data on equipment calibration.
- 10a. Pursuant to the NSPS, the Permittee shall monitor the sulfur and nitrogen content of the gas and oil being fired in the turbines as

required by 40 CFR 60.334(b) unless a custom schedule or other alternative provisions for monitoring are approved by the USEPA.

- b. The Permittee shall install monitors on each turbine and the duct burners associated with each turbine to measure and record fuel consumption (scf and gallons).
- c.
 - i. The Permittee shall either (1) install, operate, and maintain monitors for reagent injection rate and operating temperature for each SCR, or (2) install, operate, maintain continuous emission monitors for NO_x for each turbine/duct burner.
 - ii. These monitoring systems shall be operated in accordance with applicable NSPS requirements for such monitoring systems.
- 11a. The Permittee shall maintain a file of the following items:
 - i. Manufacturers specification of rated load for the turbines and duct burners;
 - ii. A copy of the Final Report(s) for emission testing conducted pursuant to Condition 9.
- b. The Permittee shall maintain the following daily and monthly operating records:
 - i. The quantity of fuel consumed for the turbines (standard cubic feet and gallons);
 - ii. The quantity of fuel consumed for the duct burners (standard cubic feet);
 - iii. Consumption of reagent by the SCR systems on a monthly basis (tons total).
- c. The Permittee shall maintain the following detailed records related to startup and shutdown of the turbines:
 - i. The following information for each startup of the turbines:
 - A. Date and time of startup;
 - B. Whether operating personnel for the turbines or air environmental staff are on site during startup; and
 - C. A description of the startup, if written operating procedures are not followed during the startup or significant operating problems occur during the startup, including detailed explanation.
 - ii. The following information for each shutdown of a turbine:

- A. Date and time of shutdown; and
 - B. A description of the shutdown, if written operating procedures are not followed during the shutdown or significant operating problems occur during the shutdown, including detailed explanation.
- d. The Permittee shall keep inspection, maintenance and repair logs with dates and the nature of such activities for the turbines (turbine burner, duct burner, and SCR system).
- e. The Permittee shall maintain the following records related to emissions from the turbines:
- i. Other data, not addressed above, used or relied upon by the Permittee to determine emissions;
 - ii. Monthly emissions of NO_x, CO, SO₂, VOM, and PM from each turbine, including the duct burners emissions. Emissions shall be calculated based on fuel consumption and operating data and site-specific emission factors developed from emission test data (NO_x, CO and VOM) and standard emission factors (PM and SO₂) or by other procedures approved by the Illinois EPA in the source's CAAPP permit;
 - iii. The annual emissions of NO_x, SO₂, PM, VOM and CO for the facility for each month using current months data and previous 11 months data with supporting calculations.
- f. The Permittee shall maintain records that identify each day in which emissions or operation exceed an applicable standard or limitation.
12. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least three years from the date of entry and shall be made available for inspection and copying by the Illinois EPA upon request. Any records retained in an electronic format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.
13. If there is an exceedance of the requirements of this permit as determined by the records required by this permit, the Permittee shall submit a written report to the Illinois EPA within 30 days after the exceedance. This report shall include the type and quantity of emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.
14. Two (2) copies of required reports and notifications concerning equipment operation or repairs, performance testing or a continuous monitoring system shall be sent to:

Illinois Environmental Protection Agency
 Division of Air Pollution Control
 Compliance Section (#40)
 P.O. Box 19276
 Springfield, Illinois 62794-9276

and one (1) copy shall be sent to the Illinois EPA's regional office at the following address unless otherwise indicated:

Illinois Environmental Protection Agency
 Division of Air Pollution Control
 9511 West Harrison
 Des Plaines, Illinois 60016

- 15a. Compliance with the emission limit for NO_x, CO and VOM in Conditions 4 and 5 shall be demonstrated by proper operation of emission units in a manner that is consistent with that during emission testing in accordance with Condition 9 that shows compliance with applicable short-term limits, based on the monitoring and records required by Conditions 10 and 11 and other relevant data.
- b. Compliance with the emission limits for PM and SO₂ for the turbines in Condition 4 shall be determined using the recordkeeping requirement of this permit and standard emission factors from USEPA's Compilation of Air Pollutant Emission Factors, AP-42 as follows:

	Turbines - Gas (Lb/MMBtu)	Turbines - Oil (Lb/MMBtu)	Duct Burner - Gas (Lb/MMBtu)	Duct Burner - Oil (Lb/mmBtu)
PM	0.007	0.012	0.007	0.007
SO ₂	0.003	0.051*	0.001	0.051*

* Based on use of very low-sulfur oil.

- c. Compliance with emission limits in Condition 4 for the backup generators shall be determined using the recordkeeping requirement of this permit and standard emission factors from USEPA's Compilation of Air Pollutant Emission Factors, AP-42 and for SO₂ emission factor of 6.92 lb/1000 gallons.
- 16. This permit is issued based on the cogeneration facility, as described in the application, not being subject to the requirements of the federal Acid Rain Program in accordance with 40 CFR Part 72.6(b)(4)(i), because the facility will not be selling one-third or more of its potential electrical output generated at the facility, pursuant to 40 CFR 72.6(b)(4)(i).
- 17. If the proposed facility will affect the status of existing boilers 5 and 6 under the NO_x Trading Program, 35 IAC Part 217, Subpart U, the

Permittee shall apply for and obtain a revision to its budget permit (CAAPP Permit 95120330, Section 6).

18. The Permittee shall notify the Illinois EPA of the following:
 - a. Commencement of construction (See also Condition 10c).
 - b. When monitors from the turbines and duct burners are installed and running.
19. This approval to construct does not relieve the Permittee of the responsibility to comply with all local, state, and federal regulations which are part of the applicable Illinois State Implementation Plan, as well as all other applicable federal, state, and local requirements.

If you have any questions concerning this permit, please call Kaushal Desai at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

DES:KKD:psj

cc: Region 1

Company: Naval Training Center
 I.D.: 097811AAC
 P.N.: 02110039

TABLE I

Emissions for the Project (Tons/Year)

<u>Pollutant</u>	
SO ₂	43.8
NO _x	42.1
CO	101.3
VOM	5.5

Note: These are the permitted emissions of the facility as limited by Condition 4.

TABLE II

Contemporaneous Changes in Emissions

<u>Pollutant/Project (Permit)</u>	<u>(Tons/Year)</u>
SO ₂	
Boiler Shutdowns	- 20.81
Gas Turbine (01010078)	<u>3.71</u>
Total	- 17.11
NO _x	
Boiler Shutdowns	- 22.06
Gas Turbine (01010078)	<u>13.05</u>
Total	- 9.01
CO	
Boiler Shutdowns	- 12.62
Gas Turbine (01010078)	<u>4.26</u>
Total	- 8.39
VOM	
Boiler Shutdowns	- 0.82
Gas Turbine (01010078)	1.25
Storage Tank (99070073)	0.39
Fueling Station (99070073)	<u>6.00</u>
Total	<u>6.82</u>

Note: This table accounts for all other increases and decreases in emissions of SO₂, NO_x, CO and VOM which occurred at the above referenced source during the five year contemporaneous period prior to the project, including the shutdown of Boilers 1, 2, and 3, which will occur prior to construction of the turbines and duct burners.

TABLE III

Net Change in Emissions (Tons/Year)

<u>Pollutant</u>	<u>Project Emissions</u>	<u>Contemporaneous Changes</u>	<u>Net Change</u>
SO ₂	43.8	- 17.11	26.7
NO _x	42.1	- 9.01	33.1
CO	101.3	- 8.39	93.0
VOM	5.5	6.82	12.32

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