



DEPARTMENT ORDER

**Portsmouth Naval Shipyard
York County
Kittery, Maine
A-452-77-13-A**

**Departmental
Findings of Fact and Order
New Source Review
NSR #13**

FINDINGS OF FACT

After review of the new source review (NSR) air emission license application, staff investigation reports, and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes (M.R.S.) § 344 and § 590, the Maine Department of Environmental Protection (the Department) finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Portsmouth Naval Shipyard
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	336611 (Ship Building and Repairing)
NATURE OF BUSINESS	National Security (Submarine repair for U.S. Navy)
FACILITY LOCATION	Kittery, Maine

B. NSR License Description

Portsmouth Naval Shipyard (PNS) has requested a New Source Review (NSR) license for the installation and operation of an 8.862-Megawatt (MW) dual-fired combined cycle turbine and associated 38.87 million Btu per hour (MMBtu/hr) natural gas-fired heat recovery steam generating (HRSG) unit to provide power to PNS.

C. Emission Equipment

The following equipment is addressed in this NSR license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate	Fuel Type	Stack #
Turbine Generator #3	88.17	86,441 scf/hr	Natural Gas	#3
	84.06	614 gal/hr	Distillate Fuel	
HRSG #3	38.87 (Duct Burner)	38,103 scf/hr	Natural Gas	#3

D. Definitions

Distillate Fuel means the following:

- Fuel oil that complies with the specifications for fuel oil numbers 1 or 2, as defined by the American Society for Testing and Materials (ASTM) in ASTM D396;
- Diesel fuel oil numbers 1 or 2, as defined in ASTM D975;
- Kerosene, as defined in ASTM D3699;
- Biodiesel, as defined in ASTM D6751; or
- Biodiesel blends, as defined in ASTM D7467.

E. Application Classification

All rules, regulations, or statutes referenced in this air emission license refer to the amended version in effect as of the issued date of this license.

The application for Turbine Generator #3 and HRSG #3 does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing, or recordkeeping requirements.

The modification of a major source is considered a major or minor modification based on whether or not expected emissions increases exceed the “Significant Emission Increase” levels as given in *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100.

Expected increases in emissions from this project will not trigger significance levels. Since Turbine Generator #3 and its associated HRSG are new pieces of equipment there are no baseline emissions for this new equipment. Quantification of projected actual emissions increases are provided in the following table.

1. Projected Actual Emissions

New emission units must use potential to emit (PTE) emissions for projected actual emissions (PAE). Those emissions are presented in the following table.

Projected Actual Emissions

Equipment	PM (tpy)	PM₁₀ (tpy)	PM_{2.5} (tpy)	SO₂ (tpy)	NO_x (tpy)	CO (tpy)	VOC (tpy)
Turbine Generator #3 & HRSG #3 Total	5.3	5.3	5.3	0.06	37.9	16.6	11.3
Total	5.3	5.3	5.3	0.06	37.9	16.6	11.3

The calculations for the maximum projected actual emissions were derived using the following scenario: Turbine Generator #3 combusting natural gas for 8246 hours per

year and Turbine Generator #3 operated on distillate fuel for 500 hours per year with 50 startup and shutdown events. Emissions from the HRSG #3 was based the unit operating 8760 hours per year. (Estimated emissions from start-ups and shutdowns were submitted in the facility's application for this project; emissions from 50 shutdown/start up were incorporated in the annual totals). PNS shall be limited to 37.9 tpy of NO_x from Turbine Generator #3 and the HRSG #3 including emissions from startup and shutdown events, and Turbine Generator #3 shall combust distillate fuel no more than 500 hours per year.

2. Emissions Increases

The emissions increase is then compared to the significant emissions increase levels.

Pollutant	Projected Actual Emissions (ton/year)	Emissions Increase (ton/year)	Significant Emissions Increase Levels (ton/year)
PM	5.3	+5.3	25
PM ₁₀	5.3	+5.3	15
PM _{2.5}	5.3	+5.3	10
SO ₂	0.06	+0.06	40
NO _x	37.9	+37.9	40
CO	16.6	+16.6	100
VOC	11.3	+11.3	40

3. Classification

Since emissions increases do not exceed significant emissions increase levels, this NSR license is determined to be a minor modification under *Minor and Major Source Air Emission License Regulations*, 06-096 C.M.R. ch. 115. An application to incorporate the requirements of this NSR license into the Part 70 air emission license shall be submitted no later than 12 months from commencement of operations associated with the addition of Turbine Generator #3 and HRSG #3.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 C.M.R. ch. 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental, and energy impacts.

B. Turbine Generator #3 and HRSG #3

Portsmouth Naval Shipyard (PNS) has proposed the installation and operation of a Solar Taurus 70 turbine and a heat recovery steam generating unit to provide power at PNS. Turbine Generator #3 is an 8.862-Megawatt (MW) dual-fired combined cycle turbine with a heat recovery steam generating (HRSG) unit equipped with a 38.87 MMBtu/hr natural gas-fired duct burner.

1. 40 C.F.R. Part 60 New Source Performance Standards (NSPS)

Turbine Generator #3 is subject to requirements of 40 C.F.R. 60, Subpart KKKK, *Standards of Performance for Stationary Gas Turbines*, because its heat input at peak load will be greater than or equal to 10 MMBtu/hr, and PNS will have commenced the construction of the turbine after February 18, 2005.

Turbine Generator #3 is a stationary combustion turbine regulated under Subpart KKKK; thus, it is exempt from the requirements of 40 C.F.R. Part 60, Subpart GG, *Standards of Performance for Stationary Gas Turbines* in accordance with 40 C.F.R. § 60.4305(b). In addition, heat recovery steam generators and duct burners regulated under Subpart KKKK are exempt from the requirements of Subpart Da, *Standards of Performance for Electric Utility Steam Generating Units*; Subpart Db, *Standards of Performance for Steam Generating Units > 100 MMBtu/hr*; and Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* per 40 C.F.R. § 60.4305(b).

40 C.F.R. Part 60, Subpart KKKK establishes the following requirements for Turbine Generator #3 and HRSG #3:

a. Emission Limits

Pursuant to 40 C.F.R. § 60.4320 and Table 1 of Subpart KKKK, Turbine Generator #3 and HRSG #3 shall meet the following NO_x emission standards when burning the associated fuel:

Natural Gas: 25 ppm at 15 percent O₂ or 150 ng/J of useful output (1.2 lb/MWh).
Distillate Fuel: 74 ppm at 15 percent O₂ or 460 ng/J of useful output (3.6 lb/MWh).

However, the BACT limits for NO_x emissions when the turbine is firing either natural gas or distillate fuel are more stringent. Therefore, in meeting the BACT NO_x limits, the facility will also be in compliance with other applicable NO_x limits. Thus, other applicable NO_x limits are streamlined to the more stringent BACT limits in this license.

Pursuant to 40 C.F.R. § 60.4330(a)(1) and (2), Turbine Generator #3 and HRSG #3 shall comply with an SO₂ emission standard of 0.90 lb/MW-hr gross output or will not burn any fuel that has the potential to emit more than 0.060 lb SO₂ per MMBtu heat input.

PNS has elected to comply with an SO₂ emission limit of 0.060 lb/MMBtu per § 60.4330(2).

b. Monitoring Requirements

Per 40 C.F.R. § 60.8(a), an initial NO_x performance test for Turbine Generator #3 is required to be conducted within 60 days after achieving the maximum production rate (i.e., the turbine's maximum rated heat output), but no later than 180 days after initial startup.

Although Subpart KKKK requires PNS to perform annual performance tests in accordance with 40 C.F.R. § 60.4400 to demonstrate continuous compliance with NO_x emission limits, 40 C.F.R. § 60.4340(a) allows PNS to perform subsequent testing every two years (in lieu of annually) if the results of the performance test are less than or equal to 75% of the emission limit contained in Subpart KKKK. Since Turbine Generator #3 is subject to BACT emission limits less than 75% of the Subpart KKKK emission limits, PNS shall be subject to performance testing on a two-year schedule.

PNS shall perform separate performance tests firing natural gas and distillate fuel. [40 C.F.R. § 60.4400(b)(1)]

The performance test shall be done at any load condition within plus or minus 25 percent of 100 percent of peak load. PNS may perform testing at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice. PNS shall conduct three separate test runs for each performance test. The minimum time per run is 20 minutes. [40 C.F.R. § 60.4400(b)]

PNS shall measure the total NO_x emissions after the duct burner rather than directly after the turbine. The duct burner must be in operation during the performance test. [40 C.F.R. § 60.4400(b)(2)]

In order to demonstrate continuous compliance with the applicable 0.060 lb/MMBtu SO₂ emission limit, PNS shall have current, valid purchase contract, tariff sheet, or transportation contract for natural gas specifying that the maximum total sulfur content of the natural gas used at the facility is less than 20 grains per 100 standard cubic feet (gr/scf) and/or that the maximum total sulfur content for oil combusted in the turbine is 0.05 weight percent (500 ppmw) or less. [40 C.F.R. § 60.4365(a)]

To demonstrate compliance with the fuel sulfur content limits, PNS, a service contractor retained by PNS, a fuel vendor, or other qualified agency shall analyze the total sulfur content of the fuel using the methods listed in 40 C.F.R. § 60.4415(a)(1).

c. Reporting Requirements

Per 40 C.F.R. § 60.7(a)(1), PNS shall submit to the Department and the U.S. EPA notification of the date construction of the new Turbine Generator #3 commenced. The submittal shall be postmarked by no later than 30 days after the commencement of construction date.

Per 40 C.F.R. § 60.7(a)(3), PNS shall submit to the Department and the U.S. EPA notification of the date of initial startup of the new Turbine Generator #3, and this notification submittal shall be postmarked by no later than 15 days after the initial startup date.

A written report of the results of each performance test shall be submitted to the Department before the close of business on the 30th day following the completion of the performance test and to the U.S. EPA before the close of business on the 60th day following the completion of the performance test.

2. National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 C.F.R. Part 63, Subpart DDDDD, *National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters*, does not apply to Turbine Generator #3 and HRSG #3 because PNS is an area source of HAP, and the HRSG does not meet the definition of “boiler” in 40 C.F.R. § 63.7575.

40 C.F.R. Part 63, Subpart JJJJJ, *National Emissions Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers*, does not apply to Turbine Generator #3 and HRSG #3 because and the Turbine does not meet the definition of “boiler” in 40 C.F.R. Part § 63.7575, and the HRSG fires only natural gas and natural gas boilers are not subject to this rule.

3. BACT Findings

Following is a summary of the BACT analysis for control of emissions from Turbine Generator #3 and HRSG #3 and the Department’s BACT determination.

a. Particulate Matter (PM, PM₁₀)

PM emissions from combined cycle turbines and their associated HRSGs are generally controlled through clean fuel selection and proper operation and maintenance. Given the use of primarily natural gas, with the limited allowable operating hours on distillate fuel, add-on controls are not economically feasible. BACT for PM and PM₁₀ emissions from the Turbine Generator #3 and HRSG #3 shall be proper operation and maintenance of the units, and good combustion practices. use of pipeline quality natural gas and distillate fuel with a sulfur content not to exceed 0.0015% by weight, and the following emission limits:

Unit	Pollutant	Limit
Turbine Generator #3 & *HRSG #3 (firing natural gas)	PM/ PM ₁₀	0.01 lb/MMBtu
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	PM/ PM ₁₀	0.016 lb/MMBtu

Unit	PM (lb/hr)	PM ₁₀ (lb/hr)
Turbine Generator #3 & *HRSG #3 (firing natural gas)	1.17	1.17
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	1.97	1.97

*HRSG #3 firing natural gas

b. Sulfur Dioxide (SO₂)

The most practical method of limiting SO₂ emissions is the use of low sulfur content fuels. PNS has proposed to fire only natural gas, with limited hours of operating firing distillate fuel with a sulfur content not to exceed 0.0015% by weight, in Turbine Generator #3. HRSG #3 is equipped to fire only natural gas. The use of

these fuels results in minimal emissions of SO₂; thus, additional add-on pollution controls are not economically feasible.

BACT for SO₂ emissions is the use of natural gas in Turbine Generator #3 with limited hours of operation firing distillate fuel with a sulfur content no greater than 0.0015% by weight. BACT for SO₂ for the HRSG #3 is the firing of natural gas. BACT determined emission limits are listed in the table below:

Unit	SO ₂ (lb/hr)
Turbine Generator #3 & *HRSG #3 (firing natural gas)	5.34E-03
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	0.14

*HRSG #3 firing natural gas

c. Nitrogen Oxides (NO_x)

PNS considered several control strategies for the control of NO_x from combined cycle turbines including the following combustion controls: EM_x (the second-generation of the SCONO_x NO_x Absorder Technology), Selective Catalytic Reduction (SCR), Selective Non-Catalytic Reduction (SNCR), and low NO_x burners.

Turbine Generator #3 will be equipped with Solar SoLoNO_xTM Combustion Technology which combines premixing and lean fuel-air mixtures with a two-stage combustion zone, thereby reducing flame temperature and consequently thermal NO_x formation. EM_x, SNCR, and SCR are post-combustion NO_x reduction technologies. EM_x utilizes a coated oxidation catalyst to remove both NO_x and CO without a reagent, such as ammonia. This system consists of a platinum-based catalyst coated with potassium carbonate to oxidize NO_x and CO. SNCR technology is based on the reaction of urea or ammonia (NH₃) with NO_x. In the SNCR chemical reaction, urea or ammonia is injected into the combustion gas path to reduce the NO_x to nitrogen and water. SCR uses ammonia to react with NO_x in the gas stream in the presence of a catalyst to form nitrogen and water.

For NO_x control, the technical and economic feasibility for EM_x, SNCR, and SCR control technologies were reviewed.

The EM_x/SCONO_xtm catalyst system operates effectively at temperatures ranging from 300-700 °F. The proposed combined cycle turbine is anticipated to have exhaust temperatures greater than 900°F. Combined cycle turbines with outlet temperatures this high using this catalyst system technology have not been identified. Consequently, it is concluded that EM_xtm /SCONO_xtm is not technically feasible for control of NO_x emissions from the proposed turbine.

The temperature range is a key component for use of SNCR for control of NO_x. The optimum temperature range for SNCR is 1,600-2,000°F. Operation at temperatures below this range results in ammonia slip while operation above this range results in oxidation of NH₃ forming additional NO_x. The temperature of the proposed turbine exhaust is to be between 900-1000°F which is below the optimum temperature range for effective operation of the SNCR. In addition, a review of the USEPA's RBLC database and USEPA's National Combustion Turbine Spreadsheet shows that SNCR has never been demonstrated on a similar sized turbine. Consequently, it was concluded that SNCR for this turbine is not technically feasible for the control of NO_x.

SCR, with a 70-90% NO_x control efficiency, was found to be a technically feasible add-on control technology for the proposed turbine. However, because of constraints from the limited space available for the construction of the new turbine, the SCR system would have to be installed after the HRSG and before the economizer section in the vertical part of the stack. Because of this location, the exhaust temperatures entering the SCR would be cooler and would negatively impact the NO_x removal rate (estimated at approximately 74%). In addition, the catalyst life would be reduced requiring more frequent replacement and the installation in a vertical stack would be more expensive. Based on these costs, the estimated cost per ton of NO_x removed using SCR on the Turbine is 15,744 \$/ton. Thus, SCR would not be economically feasible considering the cost of installing this control.

The use of SoLoNO_x TM has been determined to be feasible and has been selected as part of the BACT strategy for Turbine #3. The system is designed to achieve a guaranteed NO_x emission rate of 9 ppm_{dv} at 15% O₂ at ambient temperatures above 0 °F and steady-state operations between 50-100% load. In addition, low NO_x burners will be installed on the HRSG #3.

BACT for NO_x emissions from Turbine Generator #3 and HRSG #3 shall be the use of good combustion controls including the installation of low NO_x burners on Turbine Generator #3 and the HRSG #3, proper operation and maintenance of the units, and the following emission limits:

Unit	NO _x (ppm at 15% O ₂)	NO _x (lb/hr)
Turbine Generator #3 (firing natural gas)	9	3.2
Turbine Generator #3 & *HRSG #3 (firing natural gas)	15.1	7.5
Turbine Generator #3 (turbine firing distillate fuel)	58	20.1
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	47.9	26.9

*HRSG #3 firing natural gas and the turbine operating >0°F

d. Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

CO and VOC emissions are a result of incomplete combustion, caused by conditions such as insufficient residence time or limited oxygen availability. CO and VOC emissions from combined cycle turbines and their associated HRSGs are generally controlled through proper operation and maintenance of the units. Oxidation catalysts are used on combined cycle turbines equipped with a HRSG to reduce CO and VOC emission levels in the exhaust. The oxidation catalyst is designed to remove 80%, or more of the CO entering the unit and approximately 40% of the inlet VOC.

BACT for CO and VOC emissions from Turbine Generator #3 and HRSG #3 shall be proper operation and maintenance of the units, good combustion practices, installation and operation of an oxidation catalyst, and the following emission limits:

Unit	CO (lb/hr)	VOC (lb/hr)
Turbine Generator #3 and *HRSG #3 (firing natural gas)	1.54	2.23
Turbine Generator #3 and *HRSG #3 (turbine firing distillate fuel)	1.71	1.93

*HRSG #3 firing natural gas

e. Visible Emissions

Emissions from both Turbine Generator #3 and associated HRSG #3 exit through a common stack that is 167 feet above ground level (AGL) with an inside diameter of 5 feet.

With the common stack for the new equipment, BACT for visible emissions from Turbine Generator #3 and HRSG #3 shall be the following:

- (1) When only natural gas is being fired in one or both units, visible emissions from the common stack shall not exceed an opacity of 10% on a six-minute block average basis.
- (2) When firing distillate fuel in Turbine Generator #3, visible emissions from the common stack shall not exceed an opacity of 20% on a six-minute block average basis.
- (3) The unit operator may elect to comply with the following work practice standards during periods of startup, shutdown, malfunction, and certain equipment maintenance in lieu of the visible emission standards listed above:
 - (i) Maintain a log (written or electronic) of the date, time, and duration of all startups, shutdowns, malfunctions, or equipment maintenance of any unit or its associated air pollution control equipment which result in the operator electing to comply with this section.
 - (ii) Develop and implement a written startup and shutdown plan.
 - (iii) Limit the duration of unit startups, shutdowns, malfunctions, or equipment maintenance to not exceed one hour per occurrence.
 - (iv) Operate the unit, including any associated air pollution control equipment, at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

f. Annual Fuel Use Restriction

The distillate fuel fired in Turbine Generator #3 shall be included in the facility's distillate fuel limit of 4,900,000 gallons/year, based on a 12-month rolling total.

The natural gas fired in Turbine Generator #3 and HRSG #3 shall be included in the facility-wide limit of 2.26 billion cubic feet of natural gas per year, based on a 12-month rolling total.

g. Operational Limits

Based on the worse case operating scenario for emissions and to stay below the major modification threshold for NO_x, emissions from Turbine Generator #3 and

HRSG #3 shall not exceed 37.9 tons/year of NO_x. In addition, Turbine Generator #3 shall not operate more than 500 hours per year firing distillate fuel.

PNS shall calculate turbine uptime as well as the amount of time spent in startup/shutdown mode. The startup and shutdown processes for the turbine are estimated to take approximately ten minutes from the initiation of startup to normal operation (the startup sequence ends at approximately 50 percent load). It is estimated to take approximately ten minutes from normal operation to shut down for the turbine. Emission estimates for the periods during start up and shutdown mode shall be based on the emission data supplied as part of the NSR application for the Turbine Generator #3 and HRSG #3.

4. Emission Limits

- a. The BACT emission limits for Turbine Generator #3 and HRSG #3 are based on the following (operating scenarios w/out HRSG #3 Duct Burner operation included as supplemental information):

The BACT emission limits for Turbine Generator #3 and HRSG #3 are the following:

Unit	Pollutant	Limit
Turbine Generator #3 & *HRSG #3 (firing natural gas)	PM/ PM ₁₀	0.01 lb/MMBtu
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	PM/ PM ₁₀	0.016 lb/MMBtu
Turbine Generator #3 (firing natural gas)	NO _x	9 ppm at 15% O ₂
Turbine Generator #3 & *HRSG #3 (firing natural gas)	NO _x	15.1 ppm at 15% O ₂
Turbine Generator #3 (firing distillate fuel)	NO _x	58 ppm at 15% O ₂
Turbine Generator #3 & *HRSG #3 (turbine firing distillate fuel)	NO _x	47.9 ppm at 15% O ₂

*HRSG #3 firing natural gas

The BACT emission limits for Turbine Generator #3 and HRSG #3 are the following:

Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Turbine Generator #3 and *HRSG #3 (firing natural gas)	1.17	1.17	0.0053	7.5	1.54	2.23
Turbine Generator #3 and *HRSG #3 (turbine firing distillate fuel)	1.97	1.97	0.14	26.9	1.71	1.93

*HRSG #3 firing natural gas

b. Visible Emissions (for all operating scenarios)

The Turbine Generator #3 and HRSG #3 common stack visible emissions shall not exceed the following:

- (1) 10 percent opacity on a six-minute block average basis when Turbine Generator #3 and/or HRSG #3 are firing natural gas.
- (2) 20 percent opacity on a six-minute block average basis when Turbine Generator #3 is firing distillate fuel.
- (3) PNS may elect to comply with the following work practice standards during periods of startup, shutdown, malfunction, and certain equipment maintenance in lieu of the visible emission standards listed above.
 - (i) Maintain a log (written or electronic) of the date, time, and duration of all startups, shutdowns, malfunctions, or equipment maintenance of any unit or its associated air pollution control equipment which result in the operator electing to comply with this section.
 - (ii) Develop and implement a written startup and shutdown plan.
 - (iii) Limit the duration of unit startups, shutdowns, malfunctions, or equipment maintenance to not exceed one hour per occurrence.
 - (iv) Operate the unit, including any associated air pollution control equipment, at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

5. Oxidation Catalyst

- a. An Oxidation Catalyst shall be installed, operated, and maintained to reduce CO and VOC emissions from Turbine Generator #3.
- b. PNS shall keep documentation of all maintenance and repairs (both planned and unplanned) performed on the oxidation catalyst. The documentation shall include all planned shutdowns, maintenance procedures, and major parts replacements. These records shall be available to the Department upon request.
- c. PNS shall document the frequency of catalyst removal and replacement. Catalyst removal and replacement shall be per manufacturer's recommendations, or as needed to comply with CO and VOC emission limits.

6. Turbine Maintenance

- a. PNS shall keep documentation of all maintenance and repairs (both planned and unplanned) performed on Turbine Generator #3. The documentation shall include all planned shutdowns, maintenance procedures, and major parts replacements. These records shall be available to the Department upon request.
 [06-096 C.M.R. ch. 115, BACT]
- b. PNS may install like-kind manufacturer-supplied replacement components for the turbine that occur either as part of scheduled maintenance of a turbine or in the event of a malfunction or outage and subsequent repair. PNS shall notify the Department in writing in advance of any replacement of turbine components and shall still be subject to and responsible for any applicable New Source Performance Standard provisions with respect to replacement of the turbine or any components.
 [06-096 C.M.R. ch. 115, BACT]

7. Periodic Monitoring

- a. PNS shall monitor and record parameters for the Turbine Generator #3 and HRSG #3 duct burner as indicated in the following table:

Turbine Generator #3 and HRSG #3			
Parameter	Units of Measure	Monitoring Tool/Method	Frequency
Natural Gas Fired	Standard Cubic Feet	Fuel Receipts	Monthly and 12-month rolling total
Distillate Fuel Fired	Gallons	Fuel Receipts	Monthly and 12-month rolling total

- b. PNS shall monitor and record parameters for the oxidation catalyst used for the control of CO and VOC emissions as indicated in the following table:

Oxidation Catalyst (VOC and CO Control)				
Indicator	Units of Measure	Monitoring Tool/Method	Frequency of Monitoring	Frequency of Recordkeeping
Inlet Temperature	°F	Thermocouple	Continuously	4-Hour Averages
Pressure drop	psi	*Pressure gauge	Monthly	Monthly

* An alternative pressure measurement device may be used as approved by the Dept.
 Notes: “Continuously” means the temperature readings shall be monitored at least once per 15-minute period.

C. Compliance Assurance Monitoring

Turbine Generator #3 and HRSG #3 at PNS have potential emissions for each criteria pollutant less than 100 tons per year without consideration of pollution control, therefore, these units are not subject to 40 C.F.R. Part 64, Compliance Assurance Monitoring (CAM) (§ 64.2).

D. Incorporation into the Part 70 Air Emission License

Per *Part 70 Air Emission License Regulations*, 06-096 C.M.R. ch. 140 § 1(C)(8), for a modification at the facility that has undergone NSR requirements or been processed through 06-096 C.M.R. ch. 115, the source must apply for an amendment to their Part 70 license within one year of commencing the proposed operations, as provided in 40 C.F.R. Part 70.5.

E. Licensed Annual Emissions

PNS is currently licensed with facility-wide fuel use limits of 2.26 billion cubic feet of natural gas per year and 4,900,000 gallons of distillate fuel per year, based on a 12-month rolling total. Neither of these fuel use limits nor the licensed annual emissions will change as a result of the installation and operation of Turbine Generator #3 and HRSG #3.

III. AMBIENT AIR QUALITY ANALYSIS

PNS previously submitted an ambient air quality impact analysis outlined in Air Emission License A-452-70-A-I (March 1, 2000) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards (AAQS). An additional ambient air quality impact analysis is not required for this NSR license.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants New Source Review License A-452-77-13-A pursuant to the preconstruction licensing requirements of 06-096 C.M.R. ch. 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision of this NSR License or part thereof shall not affect the remainder of the provision or any other provisions. This NSR License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

(1) Turbine Generator #3 and HRSG #3

A. Fuel

1. PNS is licensed to fire natural gas in Turbine Generator #3 and HRSG #3.
2. PNS is also licensed to fire distillate fuel in Turbine Generator #3.
3. PNS shall install, operate, and maintain low NO_x burners on Turbine Generator #3 and HRSG #3. [06-096 C.M.R. ch.115, BACT]
4. The facility shall not purchase or otherwise obtain distillate fuel with a maximum sulfur content that exceeds 0.0015% by weight (15 ppm). [06-096 C.M.R. ch. 115, BACT]
5. Turbine Generator #3 and HRSG #3 shall not exceed SO₂ emissions greater than 0.060 lb/MMBtu heat input. [40 C.F.R. Part 60.4330(a)(1)-(2)]
6. Compliance shall be demonstrated by fuel records from the supplier showing the quantity, type, and the percent sulfur of the fuel delivered. Records of fuel use shall be kept on a monthly and 12-month rolling total basis. [06-096 C.M.R. ch. 115, BACT]

B. Emissions from Turbine Generator #3 and HRSG #3 shall not exceed the following:
[06-096 C.M.R. ch. 115, BACT]

Unit	Pollutant	Limit
Turbine Generator #3 and HRSG #3 (firing natural gas)	PM	0.01 lb/MMBtu
Turbine Generator #3 and *HRSG #3 (turbine firing distillate fuel)	PM	0.016 lb/MMBtu
Turbine Generator #3 (firing natural gas)	NO _x	9 ppm at 15% O ₂
Turbine Generator #3 and *HRSG 3# (firing natural gas)	NO _x	15.1 ppm at 15% O ₂
Turbine Generator #3 (turbine firing distillate fuel)	NO _x	58 ppm at 15% O ₂
Turbine Generator #3 and *HRSG #3 (turbine firing distillate fuel)	NO _x	47.9 ppm at 15% O ₂

*HRSG #3 firing natural gas

Emissions from Turbine Generator #3 and HRSG #3 shall not exceed following:

Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Turbine Generator #3 and *HRSG #3 (firing natural gas)	1.17	1.17	5.34E-03	7.5	1.54	2.23
Turbine Generator #3 and *HRSG #3 (turbine firing distillate fuel)	1.97	1.97	0.14	26.9	1.71	1.93

*HRSG #3 firing natural gas

C. Oxidation Catalyst

1. Inlet temperature and pressure drop operating range limits shall be established during performance testing.
2. PNS shall keep documentation of all maintenance and repairs (both planned and unplanned) performed on the oxidation catalyst. The documentation shall include all planned shutdowns, maintenance procedures, and major parts replacements. These records shall be available to the Department upon request.
3. PNS shall document the frequency of catalyst removal and replacement. Catalyst removal shall be per manufacturer's recommendations.

D. Visible Emissions (for all operating scenarios)

The Turbine Generator #3 and HRSG #3 stack visible emissions shall not exceed the following:

1. 10 percent opacity on a six-minute block average basis when Turbine Generator #3 and/or HRSG #3 are firing natural gas.
2. 20 percent opacity on a six-minute block average basis when Turbine Generator #3 is firing distillate fuel.
3. PNS may elect to comply with the following work practice standards during periods of startup, shutdown, malfunction, and certain equipment maintenance in lieu of the visible emission standards listed above.
 - a. Maintain a log (written or electronic) of the date, time, and duration of all startups, shutdowns, malfunctions, or equipment maintenance of any unit or its associated air pollution control equipment which result in the operator electing to comply with this section.
 - b. Develop and implement a written startup and shutdown plan. This plan shall be made available to the Department upon request.
 - c. Limit the duration of unit startups, shutdowns, malfunctions, or equipment maintenance to not exceed one hour per occurrence.

- d. Operate the unit, including any associated air pollution control equipment, at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.
- E. PNS shall comply with all the applicable requirements of 40 C.F.R., Part 60, Subpart KKKK, *Standards of Performance for Stationary Gas Turbines*, including, but not limited to, those identified in this NSR license.
- F. Performance Testing
1. PNS shall conduct initial performance testing to demonstrate compliance with the NO_x, CO, and VOC emission limits associated with Turbine Generator #3 and HRSG #3 within 60 days after achieving the maximum production rate (i.e., the turbine's maximum rated output), but no later than 180 days after initial startup. [40 C.F.R. § 60.8(a) and 06-096 C.M.R. ch. 115, BACT]
 2. PNS shall conduct performance testing every two years to demonstrate on-going compliance with the NO_x emission limits. (each performance test shall be conducted no more than 26 calendar months following the previous performance test). [06-096 C.M.R. ch. 115, BACT]
 3. Performance testing shall be conducted at any load condition within plus or minus 25% of 100% of peak load. PNS shall conduct three separate test runs for each performance test. The minimum run time shall be 20 minutes. The ambient temperature shall be greater than 0°F during the performance test. [40 C.F.R § 60.4400(b)]
 4. PNS shall conduct separate performance testing on each fuel. [40 C.F.R § 60.4400(b)(1)]
 5. PNS shall measure total NO_x emissions after the HRSG #3 Duct Burner rather than directly after Turbine Generator #3. The duct burner must be in operation during the performance test. [40 C.F.R § 60.4400(b)(1)]
 6. PNS shall establish operating ranges for Oxidation Catalyst inlet temperature and pressure drop values during the initial performance test and during each subsequent performance test to demonstrate effective operation of the Oxidation Catalyst between performance tests. Operating ranges shall be reestablished after each catalyst replacement.
 7. To demonstrate continuous compliance with the applicable SO₂ emission limit of 0.060 lb/MMBtu, PNS shall utilize a current, valid purchase contract, tariff sheet, or transportation contract for:

- a. natural gas specifying that the maximum total sulfur content of the natural gas used at the facility is less than 20 grains per 100 standard cubic feet.
- b. distillate fuel specifying that the maximum total sulfur content is 0.0015 weight percent (15 ppmw) or less. [40 C.F.R. § 60.4365(a)]
- c. to demonstrate compliance with the sulfur content limits, PNS, a service contractor retained by PNS, a fuel vendor, or other qualified agency shall analyze the total sulfur content of the fuel using the methods listed in 40 C.F.R. § 60.4415(a)(1).

G. Recordkeeping

1. PNS shall submit to the Department and the U.S. EPA a notification of the date construction commenced on the new Turbine Generator #3. The submittal to be postmarked by no later than 30 days after the commencement of construction date. [40 C.F.R. § 60.7(a)(1)]
 2. PNS shall submit to the Department and the U.S. EPA a notification of the actual date of initial startup of the new Turbine Generator #3 postmarked by no later than 15 days after the initial startup date. [40 C.F.R. 60.7(a)(3)]
 3. A written report of the results of each performance test shall be submitted to the Department before the close of business on the 30th day and to the U.S. EPA before the close of business on the 60th day following the completion of the performance test. [40 C.F.R. § 60.4375(b)]
- H. PNS shall keep documentation of all maintenance and repairs (both planned and unplanned) performed on Turbine Generator #3. The documentation shall include all planned shutdowns, maintenance procedures, and major parts replacements. These records shall be made available to the Department upon request. PNS shall record the frequency and duration Turbine Generator #3 startup and shutdown events. [06-096 C.M.R. ch. 115, BACT]
- I. PNS may install like-kind manufacturer-supplied replacement components for the turbines that occur either as part of scheduled maintenance of a turbine or in the event of a malfunction or outage and subsequent repair. PNS shall notify the Department in writing in advance of any replacement of turbine components and shall still be subject to and responsible for any applicable New Source Performance Standard provisions with respect to replacement of the turbine or any components. [06-096 C.M.R. ch. 115, BACT]
- J. PNS shall operate and maintain Turbine Generator #3 and its associated 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. [40 C.F.R. § 60.4333(a)]

K. Periodic Monitors

1. PNS shall monitor and record parameters for the Turbine Generator #3 and HRSG #3 Duct Burner as indicated in the following table:

Turbine Generator #3 and HRSG #3			
Parameter	Units of Measure	Monitoring Tool/Method	Frequency
Natural Gas Fired	Standard Cubic Feet	Fuel Receipts	Monthly and 12-month rolling total
Distillate Fuel Fired	Gallons	Fuel Receipts	Monthly and 12-month rolling total

2. PNS shall monitor and record parameters for the oxidation catalyst used for the control of CO and VOC emissions as indicated in the following table:

Oxidation Catalyst (VOC and CO Control)				
Indicator	Units of Measure	Monitoring tool/method	Frequency of Monitoring	Frequency of Recordkeeping
Inlet Temperature	°F	thermocouple	continuously	4-Hour average
Pressure Drop	psi	*pressure gauge	Monthly	Monthly

* An alternative pressure measurement device may be used as approved by the Department.

Notes: “Continuously” means the temperature readings will be monitored at least once per 15-minute period.

L. Annual Emission Limits for Turbine Generator #3

1. Turbine Generator #3 and HRSG #3 emissions shall not exceed 38.4 tons/year of NO_x. PNS shall keep monthly records sufficient to document the facility’s total emissions based on fuel use, operational data, and startup/shutdown events on a 12-month rolling total basis and shall make those records available to the Department upon request. [06-096 C.M.R. ch. 115, BACT]
2. PNS shall keep monthly records sufficient to document the number of hours Turbine #3 combusts distillate fuel on a 12-month rolling total basis and shall make those records available to the Department upon request. Turbine Generator #3 shall not fire distillate fuel for more than 500 hours per year. [06-096 C.M.R. ch. 115, BACT]

3. As part of documenting compliance with the annual emission limit listed above, PNS shall include turbine emissions from startup and shutdowns based on the following:

Mode	Calculate Emissions Using Emission Factors Based On...
Startup	The emissions data supplied by the turbine manufacturer at the time of the most recent permit application.
Shutdown	The emissions data supplied by the turbine manufacturer at the time of the most recent permit application.

[06-096 C.M.R. ch. 115, BACT]

(2) **Incorporation into the Part 70 Air Emission License**

PNS shall submit an application to incorporate this NSR license into the facility's Part 70 air emission license no later than 12 months from commencement of the requested operation. [06-096 C.M.R. ch. 140 § 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS 10th DAY OF FEBRUARY, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:  for
MELANIE LOYZIM, ACTING COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 1/16/2020

Date of application acceptance: 1/17/2020

Date filed with the Board of Environmental Protection:

This Order prepared by Lisa P. Higgins, Bureau of Air Quality.

