STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

Bowdoin College **Cumberland County** **Brunswick, Maine** **A-76-71-AC-A**	**Departmental** **Findings of Fact and Order** **Air Emission License** **Amendment #3**

FINDINGS OF FACT

After review of the air emission license amendment 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 (Department) finds the following facts:

I. REGISTRATION

A. Introduction

Bowdoin College (Bowdoin) was issued Air Emission License A-76-71-Z-R/A on August 14, 2015, for the operation of emission sources associated with their education facility. The license was subsequently amended on October 5, 2016 (A-76-71-AA-A), and on June 8, 2018 (A-76-71-AB-M)

Bowdoin has requested an amendment to their license to do the following:

- Install one new stationary non-emergency generator to be used in a restricted operational capacity;
- Install one new stationary emergency generator; and
- Remove four existing emergency generators and one boiler from their current air license.

Additionally, in amendment A-76-71-AA-A (October 5, 2016), one new Specific Condition was added to Air Emission License A-76-71-Z-R/A, but the new condition was not assigned a correct condition number. This amendment shall also correct this numbering error to eliminate the duplication of condition numbers.

The equipment addressed in this license amendment is located on campus at 3800 College Station in Brunswick, Maine.

B. Emission Equipment

The following equipment is addressed in this air emission license amendment:

New Non-Emergency Engine

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Fuel Type	Firing Rate (scfh)	Date of Manuf.	Date of Install.
Smith Union Generator (new)	3.5	300	Natural Gas	3,426	2019	2019

New Emergency Engine

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Fuel Type	Firing Rate (scfh)	Date of Manuf.	Date of Install.
Roux Hall Generator	1.8	150	Natural Gas	1,778	2017	2018

The following equipment is being removed from the facility, and is being listed here solely for the purposes of documenting the equipment history at Bowdoin.

Equipment Being Removed

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Fuel Type	Firing Rate	Date of Manuf.
Smith Union Generator (old)	0.6	39	Natural Gas	3,346 scfh	1994
	0.7	45	Propane	7.8 gph	
Portable Generator 1	1.0	100	Distillate Fuel	7.5 gph	2000
Portable Generator 2	3.3	300	Distillate Fuel	23.5 gph	2005
Portable Generator 3	2.0	200	Distillate Fuel	14.5 gph	2003
Thorne Hall Boiler	3.2	--	Natural Gas	3,100 scfh	2000

C. Application Classification

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

The modification of a minor source is considered a major or minor modification based on whether or not expected emission increases exceed the "Significant Emission" levels as defined in the Department's *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100. The emission increases are determined by subtracting the current licensed annual emissions preceding the modification from the maximum future licensed annual emissions, as follows:

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Significant Emission Levels
PM	10.5	10.5	0.0	100
PM_{10}	10.5	10.5	0.0	100
SO_2	36.3	36.3	0.0	100
NO_x	30.3	29.0	-1.3	100
CO	11.7	12.0	0.3	100
VOC	1.1	1.2	0.1	50

This modification is determined to be a minor modification and has been processed as such.

D. Facility Classification

With the annual heat input limits on the existing heating equipment, the operating hours restriction on the existing and new emergency generators, and the operating hours restriction on the new non-emergency generator, the facility is licensed as follows:

- As a synthetic minor source of air emissions, because the licensed emissions are below the major source thresholds for criteria pollutants; and
- As an area source of hazardous air pollutants (HAP), because the licensed emissions are below the major source thresholds for HAP.

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.

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

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

1. the existing state of technology;
2. the effectiveness of available alternatives for reducing emissions from the source being considered; and
3. the economic feasibility for the type of establishment involved.

B. Smith Union Generator (Non-Emergency)[1]

Bowdoin has requested the addition of one new non-emergency generator to their existing air emission license to reduce reliance on grid power for some of the campus buildings at selected times. The generator is a generator set consisting of an engine and an electrical generator. The engine for this generator is rated at 3.5 MMBtu/hr and fires natural gas at a maximum rate of 3,426 standard cubic feet per hour (scfh). Bowdoin requests an annual hourly operating limit for the Smith Union Generator of 500 hours per year and is targeting an installation date in September of 2019.

1. BACT Findings

a. Particulate Matter (PM and PM_{10})

PM emissions from natural gas-fired engines are generally controlled through proper operation and maintenance. Additionally, this engine will be subject to 40 C.F.R. Part 60, Subpart JJJJ, which means that it will be required to meet EPA emission standards for non-emergency stationary engines as discussed below. Given the limited annual operating hours allowed by the air license, the use of add-on controls for PM is not economically feasible. The Department finds proper operation and maintenance of the unit and an emission limit of 0.17 lb/hr to constitute BACT for PM and PM_{10} emissions from the Smith Union Generator.

b. Sulfur Dioxide (SO_2)

The Smith Union Generator is being licensed as a non-emergency generator with a licensed annual operating hour limit of 500 hours per year. This unit will fire

[1] This new generator has been designated by Bowdoin as the Smith Union Generator, which was previously used as the designation for a now obsolete generator that is being removed from their air license as part of this amendment.

natural gas, which inherently has a low fuel sulfur content. Engines of this size that fire natural gas and that are licensed to operate only for short periods of time have a limited potential for generating SO_2 emissions, making the use of wet scrubbers or other additional SO_2 add-on control methods economically unfeasible. The most practical method for limiting SO_2 emissions from the Smith Union Generator is the use of a low sulfur fuel, such as natural gas. The Department finds the use of natural gas and an emission limit of 0.002 lb/hr to constitute BACT for SO_2 emissions from the Smith Union Generator.

c. Nitrogen Oxides (NO_X)

Potentially available control options for reducing emissions of NO_X from natural gas-fired generators include combustion controls, selective catalytic reduction (SCR), and non-selective catalytic reduction (NSCR). Combustion controls are typically implemented through design features such as electronic ignition controls, injection systems, combustion chamber geometry, and turbocharging systems. Most new engines are designed with these features as standard equipment. SCR and NSCR are both post-combustion NO_X reduction technologies. SCR uses ammonia to react with NO_X in the gas stream in the presence of a catalyst to form nitrogen and water. NSCR uses a catalyst to convert CO, NO_X and hydrocarbons into carbon dioxide, nitrogen, and water without the use of an additional reagent, and requires strict air-to-fuel control to maintain high reduction effectiveness without increasing hydrocarbon emissions. For a unit of this size that is licensed to operate for a maximum of 500 hours per year, neither SCR or NSCR would be economically feasible considering its potential to generate NO_X emissions is minimal due to the limited use of the engine.

The Department finds use of good combustion controls, proper operation and maintenance of the engine, and an emission limit of 1.01 lb/hr to constitute BACT for NO_X emissions from the Smith Union Generator.

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

CO and VOC emissions from spark ignition reciprocating internal combustion engines are the result of incomplete combustion, caused by conditions such as insufficient residence time or limited oxygen availability. CO and VOC emissions from limited use natural gas-fired engines are generally controlled through proper operation and maintenance. Oxidation catalysts have been used on large engines to reduce CO and VOC emission levels in the exhaust, but like SCR and NSCR, use of an oxidation catalyst on an engine with highly limited operating hours would not provide a significant environmental benefit and would not be economically feasible.

The Department finds that proper operation and maintenance of the engine and an emissions limit of 2.03 lb/hr for CO and 0.71 lb/hr for VOC constitute BACT for CO and VOC emissions from the Smith Union Generator.

e. Visible Emissions

Visible emissions from the new Smith Union Generator shall not exceed 10% opacity on a six-minute block average basis.

The BACT emission limits for the Smith Union Generator are based on the following:

PM/PM_{10}	- 0.05 lb/MMBtu, based on 06-096 C.M.R. ch. 115, BACT
SO_2	- 0.000588 lb/MMBtu, from AP-42, Table 3.2-2, dated 7/2000
NO_x	-1.0 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
CO	- 2.0 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
VOC	- 0.7 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
Visible Emissions	- 06-096 C.M.R. ch. 115, BACT

The BACT emission limits for the new Smith Union Generator are as follows:

Unit	Pollutant	lb/MMBtu
Smith Union Generator	PM	0.05

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Smith Union Generator (3.5 MMBtu/hr) Natural Gas	0.17	0.17	0.002	1.01	2.03	0.71

Visible emissions from the new Smith Union Generator shall not exceed 10% opacity on a six-minute block average basis.

2. 40 C.F.R. Part 60, Subpart JJJJ

The federal regulation 40 CFR Part 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)* is applicable to the Smith Union Generator since the unit will commence construction after June 12, 2006, and will have been manufactured after January 1, 2008. [40 C.F.R. § 60.4230(a)(4)(ii)] By meeting the requirements of Subpart JJJJ, the unit will also meet the requirements found in the *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, 40 C.F.R. Part 63, Subpart ZZZZ. [40 C.F.R. § 63.6590(c)]

40 C.F.R. Part 60, Subpart JJJJ Requirements

a. The engine for the Smith Union Generator shall comply with the emission standards in Table 1 to 40 C.F.R. Part 60, Subpart JJJJ, as follows:

Engine Type and Fuel	Maximum Engine Power	Manufacture Date	Emission Standards (g/HP-hr)		
			NOx	CO	VOC
Non-Emergency Spark Ignition, Natural Gas	100≤HP<500	After January 1, 2011	1.0	2.0	0.7

[40 C.F.R. § 60.4233(e)]

b. Bowdoin shall keep records of conducted maintenance to demonstrate compliance with the manufacturer's emission-related written instructions for the operation and maintenance of the Smith Union Generator. Any adjustments made to the engine settings by Bowdoin shall be in accordance with the manufacturer's instructions. [40 C.F.R. § 60.4243(a)(1)]

c. Bowdoin shall operate and maintain this engine to achieve the emission standards that are specified in Table 1 to Subpart JJJJ over the entire life of the engine. [40 C.F.R. § 60.4234]

Bowdoin shall demonstrate that the engine for the Smith Union Generator complies with the emission standards specified in Table 1 to 40 C.F.R. Part 60, Subpart JJJJ by purchasing an engine that is certified according to the procedures specified in Subpart JJJJ, for the same model year. [40 C.F.R. § 60.4243(b)(1)]

d. If the engine for the Smith Union Generator is supplied with an air-to-fuel ratio controller (AFR) that is used with the operation of three-way catalysts/non-selective catalytic reduction, the AFR must be maintained and operated appropriately to ensure proper operation of the engine and control device to minimize emissions at all times. [40 C.F.R. § 60.4243(g)]

e. Bowdoin shall keep records of the following information for the Smith Union Generator:

(1) All notifications submitted to comply with Subpart JJJJ, along with all documentation supporting any notification;
(2) Maintenance conducted on the engine; and
(3) Documentation from the manufacturer that the engine is certified to meet the emission standards for non-emergency engines.

[40 C.F.R. § 60.4245]

3. The Smith Union Generator shall be equipped with a non-resettable hour meter to be used for tracking operating hours. [06-096 C.M.R. ch. 115, BACT]

4. Bowdoin shall demonstrate compliance with the annual operating limit of 500 hours per calendar year by keeping records (either written log or electronic) of all engine operating hours, based on readings taken from the non-resettable hour meter. The records shall include the hour meter readings (beginning and ending) and the date(s) of operation for each occurrence. [06-096 C.M.R. ch. 115, BACT]

C. Roux Hall Generator (Emergency)

Bowdoin has requested the addition of one new emergency generator to their existing air emission license to provide emergency power when necessary. The engine for this generator has a heat input rating of 1.8 MMBtu/hr and fires natural gas at a maximum rate of 1,778 standard cubic feet per hour (scfh).

1. BACT Findings

a. Particulate Matter (PM and PM_{10})

PM emissions from natural gas-fired engines are generally controlled through proper operation and maintenance. Additionally, this engine will be subject to 40 C.F.R. Part 60, Subpart JJJJ, which means that it will be required to meet EPA emission standards for emergency stationary engines as discussed below. Given the operating hours restriction included in 40 C.F.R. Part 60, Subpart JJJJ for emergency engines, the use of add-on controls for PM is not economically feasible. The Department finds proper operation and maintenance of the unit and an emission limit of 0.09 lb/hr to constitute BACT for PM and PM_{10} emissions from the Roux Hall Generator.

b. Sulfur Dioxide (SO_2)

The Roux Hall generator is being licensed as an emergency generator, and as such it is limited by 40 C.F.R. Part 60, Subpart JJJJ to an operating hours limitation of 100 hours per year for non-emergency use. This unit will fire natural gas, which inherently has a low fuel sulfur content. Emergency engines of this size that fire natural gas and that are licensed to operate only for short periods of time have a limited potential for generating SO_2 emissions, making the use of wet scrubbers or other additional SO_2 add-on control methods economically unfeasible. The most practical method for limiting SO_2 emissions from the Roux Hall Generator is the use of a low sulfur fuel, such as natural gas. The Department finds the use of natural gas and an emission limit of 0.001 lb/hr to constitute BACT for SO_2 emissions from the Roux Hall Generator.

c. Nitrogen Oxides (NO_X)

Potentially available control options for reducing emissions of NO_X from natural gas-fired generators include combustion controls, selective catalytic reduction (SCR), and non-selective catalytic reduction (NSCR). Combustion controls are typically implemented through design features such as electronic ignition controls, injection systems, combustion chamber geometry, and turbocharging systems. Most new engines are designed with these features as standard equipment. SCR and NSCR are both post-combustion NO_X reduction technologies. SCR uses ammonia to react with NO_X in the gas stream in the presence of a catalyst to form nitrogen and water. NSCR uses a catalyst to convert CO, NO_X and hydrocarbons into carbon dioxide, nitrogen, and water without the use of an additional reagent, and requires strict air-to-fuel control to maintain high reduction effectiveness without increasing hydrocarbon emissions. For a unit of this usage (emergency back-up engine), neither SCR or NSCR would be economically feasible considering the minimal emissions due to the limited use of the engine.

The Department finds use of good combustion controls, proper operation and maintenance of the engine, and an emission limit of 1.11 lb/hr to constitute BACT for NO_X emissions from the Roux Hall Generator.

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

CO and VOC emissions from emergency engines are the result of incomplete combustion, caused by conditions such as insufficient residence time or limited oxygen availability. CO and VOC emissions from natural gas-fired emergency engines are generally controlled through proper operation and maintenance. Oxidation catalysts have been used on large engines to reduce CO and VOC emission levels in the exhaust, but like SCR and NSCR, use of an oxidation catalyst on an emergency engine with limited yearly use would not provide a significant environmental benefit and would not be economically feasible.

The Department finds that proper operation and maintenance of the engine and an emissions limit of 2.22 lb/hr for CO and 0.55 lb/hr for VOC to constitute BACT for CO and VOC emissions from the Roux Hall Generator.

e. Visible Emissions

Visible emissions from the Roux Hall Generator shall not exceed 10% opacity on a six-minute block average basis.

The BACT emission limits for the new Roux Hall Generator are based on the following:

PM/PM_{10}	- 0.05 lb/MMBtu, based on 06-096 C.M.R. ch. 115, BACT
SO_2	- 0.000588 lb/MMBtu, from AP-42, Table 3.2-2, dated 7/2000
NO_x	-2.0 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
CO	- 4.0 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
VOC	- 1.0 g/HP-hr, from 40 C.F.R. Part 60, Subpart JJJJ, Table 1
Visible Emissions	- 06-096 C.M.R. ch. 115, BACT

The BACT emission limits for the Roux Hall Generator 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)
Roux Hall Generator 1.8 MMBtu/hr Natural Gas	0.09	0.09	0.001	1.11	2.22	0.55

Visible emissions from the Roux Hall Generator shall not exceed 10% opacity on a six-minute block average basis.

2. 40 C.F.R. Part 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Standards of Performance for Spark Ignition Internal Combustion Engines, 40 C.F.R. Part 60, Subpart JJJJ is applicable to the Roux Hall Generator since the unit will have been ordered after June 12, 2006, and will have been manufactured after January 1, 2009. [40 C.F.R. § 60.4230]

A summary of the currently applicable federal 40 C.F.R. Part 60, Subpart JJJJ requirements is listed below.

a. Emergency Engine Designation and Operating Criteria

Under 40 C.F.R. Part 60, Subpart JJJJ, a stationary reciprocating internal combustion engine (ICE) is considered an emergency stationary ICE (emergency engine) as long as the engine is operated in accordance with the following criteria. Operation of an engine outside of the criteria specified below may cause the engine to no longer be considered an emergency engine under 40 C.F.R. Part 60, Subpart JJJJ, resulting in the engine being subject to requirements applicable to non-emergency engines.

(1) Emergency Situation Operation (On-Site)

There is no operating time limit on the use of an emergency engine to provide electrical power or mechanical work during an emergency situation. Examples of use of an emergency engine during emergency situations include the following:

- Use of an engine to produce power for critical networks or equipment (including power supplied to portions of a facility) because of failure or interruption of electric power from the local utility (or the normal power source, if the facility runs on its own power production);
- Use of an engine to mitigate an on-site disaster or equipment failure;
- Use of an engine to pump water in the case of fire, flood, natural disaster, or severe weather conditions; and
- Similar instances.

(2) Non-Emergency Situation Operation

An emergency engine may be operated up to a maximum of 100 hours per calendar year for maintenance checks, readiness testing, and other non-emergency situations as described below.

(i) An emergency engine may be operated for a maximum of 100 hours per calendar year for maintenance checks and readiness testing, provided that the tests are recommended by federal, state, or local government; the manufacturer; the vendor; the regional transmission organization or equivalent balancing authority and transmission operator; or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE more than 100 hours per calendar year.

(ii) An emergency engine may be operated for up to 50 hours per calendar year for other non-emergency situations. **However, these operating hours are counted as part of the 100 hours per calendar year operating limit described in paragraph (2) and (2) (i) above.**

The 50 hours per calendar year operating limit for other non-emergency situations cannot be used for peak shaving, demand response, or to generate income for a facility by providing power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

[40 C.F.R. §§ 60.4243(d) and 60.4248]

b. 40 C.F.R. Part 60, Subpart JJJJ Requirements

(1) Manufacturer Certification Requirement
The engine shall be certified by the manufacturer as meeting the emission standards for new nonroad spark ignition engines found in 40 C.F.R. Part 60, Subpart JJJJ, Table 1. [40 C.F.R. § 60.4233]

(2) Non-Resettable Hour Meter Requirement
A non-resettable hour meter shall be installed and operated on the engine. [40 C.F.R. § 60.4237]

(3) Operation and Maintenance Requirement
The engine shall be operated and maintained according to the manufacturer's written instructions or procedures developed by Bowdoin that are approved by the engine manufacturer. Bowdoin may only change those settings that are permitted by the manufacturer. [40 C.F.R. § 60.4243]

(4) Annual Time Limit for Maintenance and Testing
As an emergency engine, the unit shall be limited to 100 hours/year for maintenance and testing. The emergency engine may operate up to 50 hours per year in non-emergency situations, but those 50 hours are included in the 100 hours total allowed for maintenance and testing. The 50 hours for non-emergency use cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. [40 C.F.R. § 60.4243(d)]

(5) Recordkeeping
Bowdoin shall keep records that include maintenance conducted on the engine and the hours of operation of the engine recorded through the non-resettable hour meter. Documentation shall include the number of hours the unit operated for emergency purposes, the number of hours the unit operated for non-emergency purposes, and the reason the engine was in operation during each time. [40 C.F.R. § 60.4245(b)]

3. 40 C.F.R. Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

D. Annual Emissions

Total Annual Emissions

Bowdoin shall be limited to the following annual emissions, based on the following:

1. A combined total heat input limit of 206,000 MMBtu per year for the Central Heating Plant Units, based on a 12-month rolling total;
2. A combined total heat input of 50,000 MMBtu per year for the non-Central Heating Plant licensed units, based on a 12-month rolling total;
3. A maximum allowable quantity of 500 gallons per year of waste oil to be fired, based on a 12-month rolling total;
4. An operating hours limit of 100 hours per calendar year for each emergency generator; and
5. A total operating hour limit of 500 hours per calendar year for the new Smith Union Generator.

Total Licensed Annual Emissions for the Facility
in Tons/Year
(used to calculate the annual license fee)

Unit	PM	PM_{10}	SO_2	NO_x	CO	VOC
Central Heating Plant Boilers Boiler #1 and Boiler #2	8.24	8.24	36.31	20.60	8.40	0.55
Non-Central Heating Plant Boilers Chamberlain Hall Hot Water Heater, Coffin Street Dorm West Hot Water Heater, Farley Field House Boiler, MacMillan House Boiler, Moulton Union Boiler, Stowe Hall Boiler, Watson Ice Arena Boilers #1, #2 and #3, Watson Ice Arena Heater and Wellness Center Boiler	2.00	2.00	0.01	2.75	2.04	0.13
Generators						
Central Heating Plant	0.04	0.04	negl.	0.61	0.13	0.05
Chamberlain Hall	0.03	0.03	negl.	0.46	0.10	0.04
Druckenmiller Hall	0.02	0.02	negl.	0.35	0.08	0.03
Farley Field House	negl.	negl.	negl.	0.13	0.01	negl.
Kanbar Hall	negl.	negl.	negl.	0.12	0.01	negl.
Memorial Hall	0.03	0.03	negl.	0.41	0.09	0.03
Moulton Union 1	negl.	negl.	negl.	0.37	0.03	0.01
Moulton Union 2 (outside)	0.04	0.04	negl.	0.59	0.13	0.05
Rhodes Hall	negl.	negl.	negl.	0.29	0.02	0.01
Roux Hall Generator (new)	negl.	negl.	negl.	0.06	0.11	0.03

Unit	PM	PM_{10}	SO_2	NO_x	CO	VOC
Generators (continued)						
Smith Union Generator (new)	0.04	0.04	negl.	0.25	0.51	0.18
Stowe Hall	negl.	negl.	negl.	0.19	0.02	0.01
Thorne Dining	0.02	0.02	negl.	0.90	0.19	0.07
Walker Art Museum	negl.	negl.	negl.	0.37	0.03	0.01
Watson Ice Arena	0.02	0.02	negl.	0.34	0.07	0.03
Wellness Center	negl.	negl.	negl.	0.17	0.01	negl.
Total TPY	10.5	10.5	36.3	29.0	12.0	1.2

Pollutant	Tons/year
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

The level of ambient air quality impact modeling required for a minor source is determined by the Department on a case-by case basis. In accordance with 06-096 C.M.R. ch. 115, an ambient air quality impact analysis is not required for a minor source if the total licensed annual emissions of any pollutant released do not exceed the following levels and there are no extenuating circumstances:

Pollutant	Tons/Year
PM_{10}	25
SO_2	50
NO_x	50
CO	250

The total licensed annual emissions for the facility are below the emission levels contained in the table above and there are no extenuating circumstances; therefore, an ambient air quality impact analysis is not required as part of this 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 Air Emission License Amendment A-76-71-AC-A subject to the conditions found in Air Emission License A-76-71-Z-R/A, in amendments A-76-71-AA-A and A-76-71-AB-M, and the following specific conditions.

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

SPECIFIC CONDITIONS

The following condition shall replace Condition (17) of Air Emission License A-76-71-Z-R/A (August 14, 2015) and A-76-71-AB-M (June 18, 2018).

(17) Small Boilers and Hot Water Heaters

A. All licensed small boilers and hot water heaters at Bowdoin are licensed to fire natural gas exclusively. These small boilers and hot water heaters shall not exceed the following emission limits [06-096 C.M.R. ch. 115, BPT]:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Chamberlain Hall Hot Water Heater (1.6 MMBtu/hr, natural gas)	0.13	0.13	negl.	0.16	0.13	0.01
Coffin St. Dorm West Hot Water Heater (1.0 MMBtu/hr, natural gas)	0.08	0.08	negl.	0.10	0.08	0.01
Farley Field House Boiler (6.4 MMBtu/hr, natural gas)	0.32	0.32	negl.	0.70	0.52	0.03
MacMillan House Boiler (1.4 MMBtu/hr, natural gas)	0.07	0.07	negl.	0.14	0.11	0.01
Moulton Union Boiler (1.6 MMBtu/hr, natural gas)	0.08	0.08	negl.	0.16	0.13	0.01
Stowe Hall Boiler (1.0 MMBtu/hr, natural gas)	0.08	0.08	negl.	0.1	0.08	0.01
Watson Ice Arena Boiler 1 (2.0 MMBtu/hr, natural gas)	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena Boiler 2 (2.0 MMBtu/hr, natural gas)	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena Boiler 3 (2.0 MMBtu/hr, natural gas)	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena Heater (1.5 MMBtu/hr, natural gas)	0.12	0.12	negl.	0.15	0.12	0.01
Wellness Center Boiler (2.0 MMBtu/hr, natural gas)	0.16	0.16	negl.	0.19	0.16	0.01

B. Visible Emissions

Visible emissions from each boiler shall be limited to no greater than 10% opacity on a six-minute block average basis, except for periods of startup, shutdown, or malfunction during which time the unit operator may elect to comply with the work practice requirements of 06-096 C.M.R. ch. 101 (3)(A) in lieu of this visible emission standard. [06-096 C.M.R. ch. 115, BPT]

The following condition shall replace Condition (19) of Air Emission License A-76-71-Z-R/A (August 14, 2015) and A-76-71-AB-M (June 18, 2018). It has been updated to reflect changes to the equipment roster, and has been renamed to Emergency Generators to denote the difference in requirements for emergency engines versus the requirements for the newly installed non-emergency engine.

(19) **Emergency Generators**

A. Emissions shall not exceed the following:

Unit	PM (lb/MMBtu)	Origin and Authority
Thorne Dining Generator	0.12	06-096 C.M.R. ch. 103

B. Emissions shall not exceed the following [06-096 CMR 115, BPT]:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Central Heating Plant Gen. (2.7 MMBtu/hr, distillate)	0.83	0.83	0.01	11.82	2.55	0.96
Chamberlain Hall Gen. (2.1 MMBtu/hr, distillate)	0.64	0.64	0.01	9.06	1.95	0.74
Druckenmiller Hall Gen. (1.5 MMBtu/hr, distillate)	0.48	0.48	0.01	6.83	1.47	0.56
Farley Field House Gen. (0.6 MMBtu/hr, natural gas)	0.01	0.01	negl.	2.53	0.20	0.07
Kanbar Hall Gen. (0.6 MMBtu/hr, natural gas)	0.01	0.01	negl.	2.42	0.19	0.07
Memorial Hall Gen. (1.8 MMBtu/hr, distillate)	0.56	0.56	0.01	7.98	1.72	0.65
Moulton Union Gen. 1 (1.8 MMBtu/hr, natural gas)	0.02	0.02	negl.	7.31	0.57	0.21
Moulton Union Gen. 2 (outside) (2.6 MMBtu/hr, distillate)	0.81	0.81	0.01	11.54	2.49	0.94
Rhodes Hall Gen. (1.4 MMBtu/hr, natural gas)	0.01	0.01	negl.	5.71	0.44	0.17

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Roux Hall Gen. (1.8 MMBtu/hr, natural gas)	0.09	0.09	0.001	1.11	2.22	0.55
Stowe Hall Gen. (0.9 MMBtu/hr, natural gas)	0.01	0.01	0.001	3.86	0.30	0.11
Thorne Dining Gen. (4.0 MMBtu/hr, distillate)	0.48	0.48	0.01	17.58	3.79	1.44
Walker Art Museum Gen. (1.8 MMBtu/hr) natural gas	0.02	0.02	negl.	7.31	0.57	0.21
Watson Ice Arena Gen. (1.6 MMBtu/hr, distillate)	0.48	0.48	0.01	6.89	1.48	0.56
Wellness Center Gen. (0.8 MMBtu/hr, natural gas)	0.01	0.01	negl.	3.32	0.26	0.10

C. Visible Emissions

1. Visible emissions from each of the distillate fuel-fired generators shall not exceed 20% opacity on a 6-minute block average basis. [06-096 C.M.R. ch. 115, BPT]
2. Visible emissions from each of the natural gas and propane-fired generators shall not exceed 10% on a 6-minute block average basis. [06-096 C.M.R. ch. 115, BPT]

D. Requirements for the Generators not Subject to Federal Rules

The Chamberlain Hall, Druckenmiller Hall, Kanbar Hall, Memorial Hall, Moulton Union 1, Stowe Hall, Thorne Dining and Walker Art Museum Generators shall meet the following:

1. Each of the emergency generators listed shall be limited to 100 hours of operation per calendar year, excluding operating hours during emergency situations. The emergency generators are only to be operated for maintenance purposes and for situations arising from sudden and reasonably unforeseeable events beyond the control of the source. The emergency generators are not to be used for prime power when reliable offsite power is available.
2. Each emergency generator shall be equipped with a non-resettable hour meter to record operating time.
3. To demonstrate compliance with the operating hours limit, Bowdoin shall keep records of the total hours of operation and the hours of emergency operation for each unit. Records shall include maintenance conducted on the engines and the hours of operation of each engine recorded through the non-resettable hour meter. Documentation shall include the hours spent for emergency operation, including what classified the operation as emergency and how many hours spent for non-emergency.

4. The fuel sulfur content for the distillate fuel-fired emergency generators shall be limited to 0.0015% sulfur by weight. Compliance shall be demonstrated by fuel records from the supplier documenting the type of fuel delivered and the sulfur content of the fuel.

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

E. 40 C.F.R. Part 60, Subpart IIII

The Central Heating Plant, Moulton Union 2 and Watson Ice Arena Generators shall meet the applicable requirements of 40 C.F.R. Part 60, Subpart IIII, including the following:

1. Manufacturer Certification

   The engines shall be certified by the manufacturer as meeting the emission standards for new nonroad compression ignition engines found in § 60.4202. [40 C.F.R. § 60.4205(b)]

2. Ultra-Low Sulfur Fuel

   The fuel fired in the engines shall not exceed 15 ppm sulfur (0.0015% sulfur) by weight. Compliance with the fuel sulfur content limit shall be based on fuel records from the supplier documenting the type of fuel delivered and the sulfur content of the fuel. [40 C.F.R. § 60.4207(b) and 06-096 C.M.R. ch. 115]

3. Non-Resettable Hour Meter

   A non-resettable hour meter shall be installed and operated on each engine. [40 C.F.R. § 60.4209(a)]

4. Annual Time Limit for Maintenance and Testing

   a. As emergency engines, the units shall each be limited to 100 hours/year for maintenance checks and readiness testing. Up to 50 hours/year of the 100 hours/year may be used in non-emergency situations (this does not include peak shaving, demand response, or to generate income for a facility by providing power to an electric grid or otherwise supply power as part of a financial arrangement with another entity). These limits are based on a calendar year. Compliance shall be demonstrated by records (electronic or written log) of all engine operating hours. [40 C.F.R. § 60.4211(f) and 06-096 C.M.R. ch. 115]

b. Bowdoin shall keep records that include maintenance conducted on each engine and the hours of operation of each engine recorded through the non-resettable hour meter. Documentation shall include the number of hours each unit operated for emergency purposes, the number of hours each unit operated for non-emergency purposes, and the reason each engine was in operation during each time. [40 C.F.R. § 60.4214(b)]

5. Operation and Maintenance

The engines shall be operated and maintained according to the manufacturer's emission-related written instructions or procedures developed by Bowdoin that are approved by the engine manufacturer. Bowdoin may only change those emission-related settings that are permitted by the manufacturer. [40 C.F.R. § 60.4211(a)]

F. 40 C.F.R. Part 60, Subpart JJJJ

The Farley Field House, Roux Hall Generator, Rhodes Hall, and Wellness Center Generators shall meet the applicable requirements of 40 C.F.R. Part 60, Subpart JJJJ, including the following:

1. Manufacturer Certification

The engines shall be certified by the manufacturer as meeting the emission standards for new nonroad spark ignition engines found in 40 C.F.R. Part 60, Subpart JJJJ, Table 1.

2. Non-Resettable Hour Meter

A non-resettable hour meter shall be installed and operated on each engine. [40 C.F.R. § 60.4237 and 06-096 C.M.R. 115, BPT]

3. Annual Time Limit for Maintenance and Testing

a. As emergency engines, the units shall each be limited to 100 hours/year for maintenance checks and readiness testing. Up to 50 hours/year of the 100 hours/year may be used in non-emergency situations (this does not include peak shaving, demand response, or to generate income for a facility by providing power to an electric grid or otherwise supply power as part of a financial arrangement with another entity). The limits are based on a calendar year. Compliance shall be demonstrated by records (electronic or written log) of all engine operating hours. [40 C.F.R. § 60.4211(f) and 06-096 C.M.R. ch. 115]

b. Bowdoin shall keep records that include maintenance conducted on each engine and the hours of operation of each engine recorded through the non-resettable hour meter. Documentation shall include the number of hours each unit operated for emergency purposes, the number of hours each unit operated for non-emergency purposes, and the reason each engine was in operation during each time. [40 C.F.R. § 60.4214(b)]

4. Operation and Maintenance

The engines shall be operated and maintained according to the manufacturer's written instructions or procedures developed by Bowdoin that are approved by the engine manufacturer. Bowdoin may only change those settings that are permitted by the manufacturer. [40 C.F.R. § 60.4243]

The following is a new Specific Condition added to Air Emission License A-76-71-Z-R/A (August 14, 2015).

(23) **Non-Emergency Generator - Smith Union Generator**

A. The Smith Union Generator shall fire natural gas exclusively. [06-096 C.M.R. ch. 115, BACT]

B. The Smith Union Generator shall have an annual operating hour limit of 500 hours per calendar year. [06-096 C.M.R. ch. 115, BACT]

C. The Smith Union Generator shall have a non-resettable hour meter installed and operational. [06-096 C.M.R. ch. 115, BACT]

D. Bowdoin shall demonstrate compliance with the annual operating limit of 500 hours per calendar year by keeping records (either written log or electronic) of all engine operating hours, based on readings taken from the non-resettable hour meter. The records shall include the hour meter readings (beginning and ending) and the date(s) of operation for each time the generator runs. [06-096 C.M.R. ch. 115, BACT]

E. Emissions shall not exceed the following:

Unit	PM (lb/MMBtu)	Origin and Authority
Smith Union Generator	0.05	06-096 C.M.R. ch. 115, BACT

F. Emissions shall not exceed the following [06-096 C.M.R. ch. 115, BACT]

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Smith Union Generator (3.5 MMBtu/hr, natural gas)	0.17	0.17	0.002	1.01	2.03	0.71

G. Visible emissions from the Smith Union Generator shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

H. The new Smith Union Generator purchased by Bowdoin shall have an engine that is certified by the manufacturer to meet the required emission limits listed in Table 1 of 40 C.F.R. Part 60, Subpart JJJJ for non-emergency, natural gas-fired engines having a maximum engine power output of 100 HP or more, but less than 500 HP. [06-096 C.M.R. ch. 115, BACT]

I. The manufacturer's certification for the new Smith Union Generator engine shall be performed in accordance with one of the methods specified in 40 C.F.R. § 60.4243(a), for the same model year, engine class and maximum engine power. [40 C.F.R. § 60.4243(b)(1)]

J. The engine for the Smith Union Generator shall comply with the applicable emission standards for new nonroad spark ignition engines that are found in Table 1 of 40 C.F.R. Part 60, Subpart JJJJ. [40 C.F.R. § 60.4233(e)]

K. Bowdoin shall operate and maintain the new generator and its emission controls in accordance with the manufacturer's emission-related written instructions. [06-096 C.M.R. ch. 115, BACT]

L. Bowdoin shall keep records of conducted maintenance to demonstrate compliance with the manufacturer's emission-related written instructions for the operation and maintenance of the generator set and control device. Any adjustments made to the engine settings by Bowdoin shall be in accordance to and consistent with the manufacturer's instructions to remain in compliance. [40 C.F.R. § 60.4243(a)(1)]

M. If the engine for the Smith Union Generator is supplied with an air-to-fuel ratio controller (AFR) that is used with the operation of three-way catalysts/non-selective catalytic reduction, the AFR must be maintained and operated appropriately to ensure proper operation of the engine and control device to minimize emissions at all times. [40 C.F.R. § 60.4243(g)]

N. Bowdoin shall operate and maintain the engine for the Smith Union Generator to achieve the emission standards specified in Table 1 to 40 C.F.R. Part 60, Subpart JJJJ over the entire life of the engine. [40 C.F.R. § 60.4234]

O. Bowdoin shall keep records of the following information for the Smith Union Generator:

1. All notifications submitted to comply with Subpart JJJJ, along with all documentation supporting any notification;
2. Maintenance conducted on the engine; and
3. Documentation from the manufacturer that the certified engine is certified to meet the emission standards.

[40 C.F.R. § 60.4245]

DONE AND DATED IN AUGUSTA, MAINE THIS 30th DAY OF August , 2019.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____ for
GERALD D. REID, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-76-71-Z-R/A.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: September 24, 2018
Date of application acceptance: September 26, 2018

Date filed with the Board of Environmental Protection:

Filed
AUG 30 2019
State of Maine
Board of Environmental Protection

This Order prepared by Patric J. Sherman, Bureau of Air Quality.