STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

Bowdoin College
Cumberland County
Brunswick, Maine
A-76-71-W-N (SM)

Departmental
Findings of Fact and Order
Air Emission License
After-The-Fact

After review of the air emissions license applications, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section §344 and Section §590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

Bowdoin College of Brunswick, Maine submitted amendments and a renewal application for the educational facility with the following proposed changes from the facility's previous air emission license:

- replacement of Boilers 1 and 2 at the Central Heating Plant with Boiler 4, a 70.0 MMBtu/hr unit firing #2 fuel oil and natural gas,
- generator additions:
  - 300 kW Portable back-up generator,
  - 125 kW back-up generator at the Watson Ice Arena,
  - 60 kW back-up generator at the Wellness Center,
  - 230 kW back-up generator outside the Moulton Union,
- boiler/heater additions:
  - small boilers (2.0 MMBtu/hr each) and a heater (1.5 MMBtu/hr) at the Watson Ice Arena,
  - hot water heater (1.0 MMBtu/hr) at Stowe Hall,
  - boiler (2.0 MMBtu/hr) at the Wellness Center,
- dual fuel firing of natural gas and #2 fuel oil in the Brunswick Apartments boilers and Boiler 3 at the Central Heating Plant,
- switching from propane to natural gas in the Chamberlain Hall hot water heater, the Coffin Street Dorm West hot water heater, the Farley Field House boiler, the Moulton Union boiler, and the Thorn Hall boiler,
- removal of three previously licensed boilers at the Morrell gym, Pickard Field House, and Squash Courts,
- removal of the previously licensed back-up generator at the Morrell gym,
- location/name change of the Whittier St. Warehouse generator (100 kW) to Portable generator to be stored on site,
- correction of the capacity of the Stowe Hall generator from 70 kW to 75 kW, and

- firing ASTM (American Society of Testing and Materials) D396 #2 fuel oil in the non-central heating plant oil units, and
- establishing a 37.05 tons/year SO_2 limit from the Central Heating Plant to allow for fuel oil sulfur content flexibility, with a maximum of ASTM D396 #2 fuel oil, 0.5% sulfur. (Bowdoin College had previously been limited to 0.35% sulfur in the Central Heating Plant, however will now be subject to a tons/year limit with sulfur recordkeeping requirements).

This license incorporates the following submitted applications: amendments A-76-71-T-A, A-76-71-U-A, A-76-71-V-A and the renewal A-76-71-W-N.

B. Emission Equipment

The tables below list the equipment addressed in this license (changes are italicized):

Main Boilers

Equipment	Maximum Capacity (MMBtu/hr)	Firing Rate	Fuel Type, % sulfur*	Changes
Boiler 1- Central Heating Plant	*45.1*	*322.1 gal/hr*	*#2 fuel ASTM D396, biodiesel*	*To be removed once Boiler 4 is on-line*
Boiler 2 - Central Heating Plant	*29.3*	*209.3 gal/hr 28,725 scf/hr*	*#2 fuel ASTM D396, biodiesel Natural gas*	*To be removed once Boiler 4 is on-line*
Boiler 3 - Central Heating Plant	48.8 oil *51.3 gas*	348.6 gal/hr *50,294 scf/hr*	#2 fuel *ASTM D396,* biodiesel *Natural gas*	*Add nat'l gas*
Boiler 4 - Central Heating Plant	*70.0*	*500 gal/hr 68,627 scf/hr*	*#2 fuel ASTM D396, biodiesel Natural gas*	*ADD to license (replaces boilers 1 and 2)*

* The #2 fuel fired in the Central Heating Plant shall meet the ASTM D396 requirements (max. sulfur content of 0.5%), but Bowdoin may use varying sulfur contents up to 0.5% to meet the SO_2 tons/year limit.

Smaller Boilers/Hot Water Units

Boilers	Maximum Capacity (MMBtu/hr)	Firing Rate	Fuel Type, % sulfur	Changes
Admissions Building Boiler	1.2	8.3 gal/hr	#2 fuel, biodiesel	*ASTM #2 fuel*
Brunswick Apartments Boiler	4.2	29.9 gal/hr *4103 scf/hr*	#2 fuel, biodiesel *Natural gas*	*ASTM #2 fuel* *Add nat'l gas*
Brunswick Apartments Boiler	4.2	29.9 gal/hr *4103 scf/hr*	#2 fuel, biodiesel *Natural gas*	*ASTM #2 fuel* *Add nat'l gas*
Chamberlain Hall Boiler	1.6	*1569 scf/hr*	*Natural gas*	*Switch from propane to nat'l gas*
Coffin Street Dorm West Boiler	1.0	*980 scf/hr*	*Natural gas*	*Switch from propane to nat'l gas*
Farley Field House Boiler	2.5	*2451 scf/hr*	*Natural gas*	*Switch from propane to nat'l gas*
MacMillan House Boiler	1.3	9.6 gal/hr	#2 fuel, biodiesel	*ASTM #2 fuel*
Moulton Union Boiler	1.2	*1199 scf/hr*	*Natural gas*	*Switch from propane to nat'l gas*
Smith Union Boiler	2.4	26.0 gal/hr	Propane	-
Stowe Hall Boiler	*1.0*	*980 scf/hr*	*Natural gas*	*ADD to license*
Thorn Hall Boiler	3.2	*3110 scf/hr*	*Natural gas*	*Switch from propane to nat'l gas*
Watson Ice Arena Boiler	*2.0*	*1961 scf/hr*	*Natural gas*	*ADD to license*
Watson Ice Arena Boiler	*2.0*	*1961 scf/hr*	*Natural gas*	*ADD to license*
Watson Ice Arena Boiler	*2.0*	*1961 scf/hr*	*Natural gas*	*ADD to license*
Watson Ice Arena Boiler	*1.5*	*1471 scf/hr*	*Natural gas*	*ADD to license*
Wellness Center Boiler	*2.0*	*1961 scf/hr*	*Natural gas*	*ADD to license*

Generators

Unit	Power Output (kW)	Max. Capacity (MMBtu/hr)	Firing Rate	Fuel Type	Changes
Central Heating Plant	200	2.0	14.5 gal/hr	Diesel	-
Chamberlain Hall	200	2.1	15.0 gal/hr	Diesel	-
Druckenmiller Hall	150	1.5	11.3 gal/hr	Diesel	-
Hubbard Hall	125	1.3	9.5 gal/hr	Diesel	-
Kanbar Hall	42	0.6	576 scf/hr	Natural Gas	-
Memorial Hall	175	1.8	13.2 gal/hr	Diesel	-
Moulton Union	150	1.8	1740 scf/hr	Natural gas	-
Moulton Union (outside)	*230*	*2.6*	*19.1 gal/hr*	*Diesel*	*ADD to license*
Portable 1	100	1.0	7.5 gal/hr	Diesel	*Change from Whittier Street Warehouse to Portable*
Portable 2	*300*	*3.1*	*22.3 gal/hr*	*Diesel*	*ADD to license*
Rhodes Hall	75	1.1	11.84 gal/hr	Propane	-
Smith Union	45	0.7	7.84 gal/hr	Propane	-
Stowe Hall	*75*	0.9	898 scf/hr	Natural Gas	*Change from 70 kW to 75 kW*
Thorn Dining	400	4.0	29.1 gal/hr	Diesel	-
Walker Art Museum	150	1.8	1740 scf/hr	Natural gas	-
Watson Ice Arena	*125*	*1.6*	*11.4 gal/hr*	*Diesel*	*ADD to license*
Wellness Center	*60*	*0.8*	*789 scf/hr*	*Natural gas*	*ADD to license*

The following units are no longer licensed:

Removed from License:

Units	Maximum Capacity (MMBtu/hr)	Fuel Type, % sulfur
Morrell Gym Boiler	*1.3*	*Propane*
Morrell Gym Generator	*0.6*	*Diesel*
Pickard Field House Boiler	*1.4*	*#2 fuel*
Squash Courts Boiler	*1.8*	*Propane*

C. Application Classification

The previous air emission license for Bowdoin College expired on August 2, 2009. A complete application was not submitted on time, therefore Bowdoin College is considered to be an existing source applying for an after-the-fact renewal. The Department has determined the facility is a minor source and the application has been processed through *Major and Minor Source Air Emission License Regulations*, 06-096 CMR 115 (last amended December 24, 2005). With the facility-wide limits and the operating hour restriction on the emergency generators, Bowdoin College is licensed below the major source thresholds and is considered a synthetic minor.

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 CMR 100 (last amended December 24, 2005). 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 CMR 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

BPT for an after-the-fact renewal requires an analysis similar to a Best Available Control Technology analysis per 06-096 CMR 115.

B. Central Heating Plant - Main Boilers

Bowdoin College currently operates three primary boilers at the Central Heating Plant. Bowdoin College has proposed to replace Boiler 1 and Boiler 2 with Boiler 4. Boiler 3 shall remain in operation at the facility. The Central Heating Plant boilers shall be limited to 37.05 tons/year SO_2. Records shall be maintained to demonstrate compliance with this limit, including the amount of each type of fuel fired (#2 fuel oil, biodiesel, natural gas) and sulfur content of the #2 fuel oil. The biodiesel fired in the boilers is assumed to be included in the fuel oil calculations. A constituent of the biodiesel is organic (vegetable-type) oil and the sulfur is expected to be below the sulfur found in #2 fuel oil.

1. Boilers 1 and 2

Boiler 1 is a B&W boiler rated at 45.1 MMBtu/hr, manufactured in 1963. Boiler 2 is a Cleaver-Brooks boiler rated at 29.3 MMBtu/hr, manufactured in 1996. Boiler 1 fires #2 fuel oil or biodiesel. Boiler 2 fires #2 fuel oil, natural gas, or biodiesel. Previously, the sulfur content was limited to 0.35% sulfur, but this license allows for up to 0.5% sulfur (#2 fuel oil meeting ASTM D396 requirements) as long as the 37.05 tons/year SO_2 limit is met from the Central Heating Plant.

Boiler 2 is subject to 40 CFR (Code of Federal Regulations) Part 60, Subpart Dc: *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* for units constructed after June 9, 1998 with a design capacity between 10 and 100 MMBtu/hr. Boiler 1 is not subject to 40 CFR Part 60, Subpart Dc.

Once boiler 4 is installed and operating, boilers 1 and 2 shall not be operated and shall be removed from the site.

The BACT/BPT emission limits for boilers 1 and 2 were based on the following:

PM/PM_{10} – 0.08 lb/MMBtu for boilers 1 and 2 based on BACT.

SO_2 – use of ASTM D396 #2 fuel oil for boilers 1 and 2; and 0.6 lb/MMscf from AP-42, Table 1.4 (dated 7/98) for boiler 2 on nat'l gas.

NO_X – 0.3 lb/MMBtu from previous license for boilers 1 and 2 firing #2 fuel oil; and 100 lb/MMscf from AP-42, Table 1.4 (dated 7/98) for boiler 2 firing nat'l gas.

CO – 5 lb/1000 gal from AP-42, Table 1.3 (dated 9/98) for boilers 1 and 2 firing #2 fuel oil; and 84 lb/MMscf from AP-42, Table 1.4 (dated 7/98) for boiler 2 firing nat'l gas.

VOC – 0.2 lb/1000 gal from AP-42, Table 1.3 (dated 9/98) for boilers 1 and 2 firing #2 fuel oil; and 5.5 lb/MMscf from AP-42, Table 1.4 (dated 7/98) for boiler 2 firing nat'l gas.

Unit	PM lb/hr	PM_{10} lb/hr	SO_2 lb/hr	NO_X lb/hr	CO lb/hr	VOC lb/hr
Boiler 1 (fuel oil)	3.6	3.6	22.7	13.5	1.6	0.06
Boiler 2 (fuel oil)	2.3	2.3	14.8	8.8	1.1	0.04
Boiler 2 (nat'l gas)	2.3	2.3	0.02	2.8	2.4	0.2

Opacity – Visible emissions from each boiler when firing fuel oil shall not exceed an opacity of 20% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

Visible emissions from boiler 2 when firing natural gas shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

2. Boiler 3

Boiler 3 is a B&W boiler rated at 48.8 MMBtu/hr, manufactured in 1973. Boiler 3 previously only fired #2 fuel oil (limited to 0.35% sulfur) or biodiesel. Bowdoin College has requested duel fuel capability in boiler 3 to fire oil or natural gas. Due to the configuration of Boiler 3, the unit will have a maximum capacity of 51.3 MMBtu/hr when firing natural gas, slightly higher then when firing #2 fuel oil. This license allows for up to 0.5% sulfur (#2 fuel oil meeting ASTM D396 requirements) as long as the 37.05 tons/year SO_2 limit is met from the Central Heating Plant.

Boiler 3 is not subject to 40 CFR Part 60, Subpart Dc.

The BACT/BPT emission limits for boiler 3 were based on the following:

PM/PM_{10} – 0.08 lb/MMBtu based on BACT.
SO_2 – use of ASTM D396 #2 fuel oil and 0.6 lb/MMscf from AP-42, Table 1.4 (dated 7/98) firing nat'l gas.
NO_X – 0.3 lb/MMBtu firing #2 fuel oil from previous license and 100 lb/MMscf from AP-42, Table 1.4 (dated 7/98) firing nat'l gas.
CO – 5 lb/1000 gal from AP-42, Table 1.3 (dated 9/98) firing #2 fuel oil and 84 lb/MMscf from AP-42, Table 1.4 (dated 7/98) firing nat'l gas.
VOC – 0.2 lb/1000 gal from AP-42, Table 1.3 (dated 9/98) firing #2 fuel oil and 5.5 lb/MMscf from AP-42, Table 1.4 (dated 7/98) firing nat'l gas.

	PM lb/hr	PM_{10} lb/hr	SO_2 lb/hr	NO_X lb/hr	CO lb/hr	VOC lb/hr
Boiler 3 (#2 fuel oil)	3.9	3.9	24.6	14.6	1.7	0.07
Boiler 3 (nat'l gas)	4.1	4.1	0.03	5.03	4.22	0.28

Opacity - Visible emissions from boiler 3 when firing fuel oil shall not exceed an opacity of 20% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

Visible emissions from boiler 3 when firing natural gas shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

3. Boiler 4

Boiler 4 is a replacement for boilers 1 and 2. Proposed Boiler 4 is to be a 70.0 MMBtu/hr unit with a firing rate of 500 gal/hr on #2 fuel oil and 68,628 scf/hr on natural gas. Biodiesel may also be fired. Boiler 4 is subject to 40 CFR Part 60, Subpart Dc.

A BACT analysis was submitted by Bowdoin College. The following is a summary of the BACT findings:

PM/PM_{10} – Particulate matter emissions for boilers of this size and fuel type are minimized by good combustion practices. Bowdoin shall meet the 0.08 lb/MMBtu particulate matter limit found in *Fuel Burning Equipment Particulate Emission Standard* 06-096 CMR 103 (last amended January 24, 1983) for fuel oil.

BACT for PM/PM_{10} emissions from Boiler 4 is 0.08 lb/MMBtu (5.6 lb/hr).

SO_X – SO_2 emissions correlate to the amount of sulfur in the fuel. This license allows for up to 0.5% sulfur (#2 fuel oil meeting ASTM D396 requirements) as long as the 37.05 tons/year SO_2 limit is met from the Central Heating Plant.

The sulfur content of natural gas is minimal. Natural gas SO_2 emissions were based on AP-42 section 1.4, dated 7/98: 0.6 lb/MMscf. This is less than the 0.06 lb/MMBtu gaseous fuels limit in 40 CFR Part 60, Subpart Dc, section 60.47c(c) to operate without a continuous opacity monitor.

BACT for SO_2 emissions from Boiler 4 is 35.3 lb/hr firing ASTM D396 #2 fuel oil and 0.04 lb/hr firing natural gas.

NO_X – Bowdoin College considered three main options for the control of NO_X emissions from the proposed boiler: low NO_X burner, low NO_X burner with flue gas recirculation (FGR), and low NO_X burner with Selective Catalytic Reduction (SCR). Selective Non-Catalytic Reduction (SNCR) was not considered due to boiler size, frequent boiler modulation, and cost.

Low NO_X burners are used in boilers firing natural gas and/or #2 fuel oil to reduce peak flame temperature, thereby reducing the thermal oxidation of atmospheric nitrogen. The burners control and limit the introduction of combustion air into the flame zone. Low NO_X burners can be designed with FGR, which returns a portion of the boiler exhaust and mixes it with combustion air prior to introduction to the burner. SCR involves injecting ammonia reagents for NO_X control and testing the catalyst periodically for operational efficiency. SCR is typically used on larger boilers, but was included as an option for this boiler.

The BACT analysis compared the three options using manufacturer's data and Bowdoin's license limits. The results, as compared to a baseline of a low NO_X burner alone, showed a cost per ton of NO_X removed of $227 per ton for a low NO_X burner and FGR, and $9615 per ton for a low NO_X burner and SCR. These numbers take into account the capital cost alone (including the annual operating and maintenance costs of SCR would increase the $/ton figure even further).

Based on the environmental risks of SCR ammonia use and the result of the cost analysis, Bowdoin has proposed the use of a dual fuel low NO_X burner and FGR to control NO_X emissions.

The NO_X emission limit when firing #2 fuel oil was based 0.2 lb/MMBtu. The natural gas NO_X emission limit was based on AP-42 section 1.4, dated 7/98: 100.0 lb/MM scf.

BACT for NO_X emissions from Boiler 4 is the use of low NO_X burners with flue gas recirculation, 0.2 lb/MMBtu (14.0 lb/hr) firing #2 fuel oil, and 6.80 lb/hr firing natural gas.

CO – Carbon monoxide emissions for boilers of this size and fuel type are minimized by good combustion practices. #2 fuel oil CO emissions were based on AP-42 section 1.3, dated 9/98: 5 lb/1000 gallons. Natural gas

CO emissions were based on AP-42 section 1.4, dated 7/98: 84.0 lb/MM scf.

BACT for CO emissions from Boiler 4 is 2.5 lb/hr firing #2 fuel oil and 5.71 lb/hr firing natural gas.

VOC – Volatile organic compound emissions for boilers of this size and fuel type are minimized by good combustion practices. #2 fuel oil VOC emissions were based on AP-42 section 1.3, dated 9/98: 0.2 lb/1000 gallons. Natural gas VOC emissions were based on AP-42 section 1.4, dated 7/98: 5.5 lb/MM scf.

BACT for VOC emissions from Boiler 4 is 0.1 lb/hr firing #2 fuel oil and 0.37 lb/hr firing natural gas.

Opacity – Visible emissions shall be limited to no greater than 20% opacity on a six (6) minute average, except for one (1) six (6) minute period per hour of not more than 27% opacity, based on the requirements of 40 CFR Part 60, Subpart Dc, section 60.43c(c).

New Source Performance Standards: 40 CFR Part 60, Subpart Dc
Bowdoin College has proposed to meet the PM and SO_2 requirements in 40 CFR Part 60 Subpart Dc by limiting the fuel oil sulfur content to less than 0.5% and firing gaseous fuel with a potential SO_2 emission rate of 0.060 lb/MMBtu or less in boiler 4. Section 60.47c(c) allows for an exemption from operating a continuous opacity monitor for this sized boiler if this fuel requirement is met.

Additional requirements of 40 CFR Part 60, Subpart Dc include, but are not limited to:

- Notification to EPA of the construction and actual startup of the unit,
- Initial performance testing for opacity,
- Fuel certification documentation,
- Maintenance of records of the amount of each fuel combusted during each calendar month, and
- Fuel use reporting for each 6 month period.

4. Central Heating Plant Periodic Monitoring
Periodic monitoring for the boilers at the Central Heating Plant (Boilers 1-3 until Boiler 4 is installed; Boilers 3 and 4 when installation is complete) shall include recordkeeping to document fuel use both on a monthly and 12 month rolling total basis. Documentation shall include the type of fuel used and certification of the sulfur content of the #2 fuel oil. The sulfur content of the

fuel shall be documented on a 30 day rolling average, as allowed for in 40 CFR Part 60, Subpart Dc.

C. Ancillary Boilers and Water Heaters

Bowdoin College operates small boilers used to provide heat and hot water during the summer months and in buildings not supported by the steam plant. These non-central heating plant units have a facility-wide fuel limit of 50,000 MMBtu/yr.

1. Changes from the previous license

   a. Firing ASTM D396 #2 Fuel Oil in Non-Central Heating Plant Units

      In order to facilitate recordkeeping and to be consistent with similar units at other facilities, Bowdoin College has requested that the #2 fuel oil fired in boilers which are not part of the Central Heating Plant be certified as ASTM D396 #2 fuel oil. The maximum sulfur content of this fuel oil is 0.5% by weight.

   b. Addition of small boilers/heaters

      Four natural gas boilers, three rated at 2.0 MMBtu/hr and one rated at 1.5 MMBtu/hr, will be located at the Watson Ice Arena. A 1.0 MMBtu/hr natural gas boiler will be located at Stowe Hall. A 2.0 MMBtu/hr natural gas boiler will be located at the Wellness Center.

   c. Dual Fuel Capacity (Brunswick Apartments)

      Bowdoin College has requested that the two boilers in the Brunswick apartments (4.2 MMBtu/hr each) have dual fuel capability to include the firing of natural gas. The boilers currently fire #2 fuel oil only.

   d. Switching from propane to natural gas (boilers in Chamberlain Hall, Coffin Street Dorm West, Farley Field House, Moulton Union, and Thorn Hall)

      Bowdoin College has proposed to switch the boilers in Chamberlain Hall (1.6 MMBtu/hr), Coffin Street Dorm West (1.0 MMBtu/hr), Farley Field House (2.5 MMBtu/hr), Moulton Union (1.2 MMBtu/hr), and Thorn Hall (3.2 MMBtu/hr) from propane to natural gas.

2. Requirements for the ancillary boilers and water heaters

The BACT/BPT emission limits for the small boilers/water heaters were based on the following:

Fuel oil (#2 or biodiesel)

PM/PM_{10} – 0.08 lb/MMBtu based on BACT.
SO_2 –based on firing 0.5% sulfur; 0.5036 lb/MMBtu
NOx – 0.2 lb/MMBtu based on previous licenses
CO – 5 lb/1000 gal, AP-42, Table 1.3, dated 9/98
VOC – 0.34 lb/1000 gal, AP-42, Table 1.3, dated 9/98
Opacity – Visible emissions from each boiler firing fuel oil shall not exceed 20% opacity on a 6 minute block average, except for no more than one (1) six (6) minute block average in a 3 hour period.

Natural gas
PM/PM_{10} – 0.08 lb/MMBtu based on BACT.
SO_2 – 0.6 lb/MMscf: AP-42, Table 1.4 (dated 7/98)
NO_X – 100 lb/MMscf: AP-42, Table 1.4 (dated 7/98)
CO – 84 lb/MMscf: AP-42, Table 1.4 (dated 7/98)
VOC – 5.5 lb/MMscf: AP-42, Table 1.4 (dated 7/98)
Opacity – Visible emissions from each of the boilers firing natural gas shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

Propane (updated AP-42 factors from those used in the previous license)
PM/PM_{10} – 0.08 lb/MMBtu based on BACT.
SO_2 – negligible
NO_X – 13 lb/1000 gal: AP-42, Table 1.5-1 (dated 7/08)
CO – 7.5 lb/1000 gal: AP-42, Table 1.5-1 (dated 7/08)
VOC – 1.0 lb/1000 gal: AP-42, Table 1.5-1 (dated 7/08)
Opacity – Visible emissions from the boiler firing propane shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Admin. Blg. (1.2 MMBtu/hr) #2 fuel, biodiesel	0.10	0.10	0.6	0.24	0.04	negl.
Brunswick Apts (4.2 MMBtu/hr each – 2 units) #2 fuel, biodiesel	0.34	0.34	2.1	0.84	0.15	0.01
nat'l gas	0.34	0.34	negl.	0.41	0.34	0.02
Chamberlain Hall (1.6 MMBtu/hr) nat'l gas	0.13	0.13	negl.	0.16	0.13	0.01
Coffin St. Dorm West (1.0 MMBtu/hr) nat'l gas	0.08	0.08	negl.	0.10	0.082	0.01
Farley Field House (2.5 MMBtu/hr) nat'l gas	0.2	0.2	negl.	0.24	0.20	0.013
MacMillan House (1.3 MMBtu/hr) #2 fuel or biodiesel	0.10	0.10	0.65	0.26	0.05	negl.
Moulton Union (1.2 MMBtu/hr) nat'l gas	0.10	0.10	negl.	0.12	0.1	0.01
Smith Union (2.5 MMBtu/hr) propane	0.19	0.19	negl.	0.35	0.2	0.03
Stowe Hall (1.0 MMBtu/hr) nat'l gas	0.08	0.08	negl.	0.1	0.08	0.01
Thorn Hall (3.2 MMBtu/hr) nat'l gas	0.26	0.26	negl.	0.31	0.26	0.02
Watson Ice Arena nat'l gas (2.0 MMBtu/hr each – 3 units)	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena (1.5 MMBtu/hr) nat'l gas	0.12	0.12	negl.	0.15	0.12	0.01
Wellness Center (2.0 MMBtu/hr) nat'l gas	0.16	0.16	negl.	0.19	0.16	0.01

3. Non-Central Heating Plant Periodic Monitoring
   Periodic monitoring for the ancillary boilers and hot water heaters shall include recordkeeping to document fuel use both on a monthly and 12 month rolling total basis. Documentation shall include the type of fuel used. Records shall be maintained to documents compliance with the 50,000 MMBtu/yr non-central heating plant fuel limit.

D. Generators

Bowdoin College has proposed a number of new back-up generators in addition to the existing units. The new generators include a 300 kW (3.1 MMBtu/hr) diesel portable unit (portable 2), a 125 kW (1.6 MMBtu/hr) diesel unit located at the

Watson Ice Arena, a natural gas 60 kW (0.8 MMBtu/hr) unit at the Wellness Center, and a 230 kW (2.6 MMBtu/hr) diesel unit at the Moulton Union.

This license also changes the location and name of the Whittier St. Warehouse generator to a portable generator stored on site. The Stowe Hall generator capacity is corrected from 70 kW to 75 kW.

The BACT/BPT emission limits for the back-up generators are based on the following:

Diesel (also used for propane due to lack of available factors)

PM/PM_{10} – 0.12 lb/MMBtu based on 06-096 CMR 103 for the Thorn Dining and Portable 2 units; 0.31 lb/MMBtu from AP-42 Table 3.3-1 (dated 10/96) for the other units;

SO_2 –based on firing 0.05% sulfur; 0.05 lb/MMBtu; 0.001 lb/MMBtu for propane

NOx – 4.41 lb/MMBtu, AP-42, Table 3.3-1 (dated 10/96);

CO – 0.95 lb/MMBtu, AP-42, Table 3.3-1 (dated 10/96);

VOC – 0.36 lb/MMBtu, AP-42, Table 3.3-1 (dated 10/96);

Opacity – Visible emissions from each of the diesel generators shall not exceed 20% opacity on a 6 minute block average, except for no more than two (2) six (6) minute block averages in a 3 hour period.

Natural gas

PM/PM_{10} – 0.00991 lb/MMBtu: AP-42, Section 3.3-2 for 4-stroke engines

SO_2 – 0.000588 lb/MMBtu: AP-42, Section 3.3-2 for 4-stroke engines

NO_X – 4.08 lb/MMBtu: AP-42, Section 3.3-2 for 4-stroke engines

CO – 0.317 lb/MMBtu: AP-42, Section 3.3-2 for 4-stroke engines

VOC – 0.118 lb/MMBtu: AP-42, Section 3.3-2 for 4-stroke engines

Opacity – Visible emissions from each of the natural gas generators shall not exceed an opacity of 10% on a 6 minute block average basis, except for no more than one (1) six (6) minute block average in a 3 hour period.

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 (2.0 MMBtu/hr) diesel, 0.05%	0.62	0.62	0.10	8.76	1.89	0.72
Chamberlain Hall (2.1 MMBtu/hr) diesel, 0.05%	0.64	0.64	0.10	9.06	1.95	0.74
Druckenmiller Hall (1.5 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.08	6.83	1.47	0.56
Hubbard Hall (1.3 MMBtu/hr) diesel, 0.05%	0.40	0.40	0.07	5.74	1.24	0.47
Kanbar Hall (0.6 MMBtu/hr) nat'l gas	0.01	0.01	negl.	2.42	0.19	0.07
Memorial Hall (1.8 MMBtu/hr) diesel, 0.05%	0.56	0.56	0.09	7.98	1.72	0.65
Moulton Union (1.8 MMBtu/hr) nat'l gas	0.02	0.02	negl.	7.31	0.57	0.21
Mouton Union (outside) (2.6 MMBtu/hr) diesel, 0.05%	0.81	0.81	0.13	11.54	2.49	0.94
Portable 1 (1.0 MMBtu/hr) diesel, 0.05%	0.32	0.32	0.05	4.53	0.98	0.37
Portable 2 (3.1 MMBtu/hr) diesel, 0.05%	0.37	0.37	0.15	13.47	2.90	1.10
Rhodes Hall (1.1 MMBtu/hr) propane	0.13	0.13	negl.	4.91	1.06	0.40
Smith Union (0.7 MMBtu/hr) propane	0.09	0.09	negl.	3.25	0.70	0.27
Stowe Hall (0.9 MMBtu/hr) nat'l gas	0.01	0.01	negl.	3.77	0.29	0.11
Thorn Dining (4.0 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.20	17.58	3.79	1.44
Walker Art Museum (1.8 MMBtu/hr) nat'l gas	0.02	0.02	negl.	7.31	0.57	0.21
Watson Ice Arena (1.6 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.08	6.89	1.48	0.56
Wellness Center (0.8 MMBtu/hr) nat'l gas	0.01	0.01	negl.	3.32	0.26	0.1

Each of the back-up generators shall be limited to 500 hours of operation a year, based on a 12 month rolling total. Bowdoin College shall keep records of the

hours of operation for each unit. The back-up generators are to be operated only for maintenance purposes and for situations arising from sudden and reasonably unforeseeable events beyond the control of the source. The back-up generators are not to be used for prime power when reliable offsite power is available.

New Source Performance Standards: 40 CFR Part 60, Subparts IIII and JJJJ

The Moulton Union (outside) diesel generator, manufactured in 2009, and the Watson Ice Arena diesel generator, manufactured in 2008, were ordered after July 11, 2005 and manufactured after April 1, 2006. Therefore, the Moulton Union (outside) and Watson Ice Arena diesel generators are subject to New Source Performance Standards 40 CFR Part 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.*

The Wellness Center natural gas generator, manufactured in 2009, was ordered after July 12, 2006 and manufactured after January 1, 2009. Therefore, the Wellness Center natural gas generator is subject to New Source Performance Standards 40 CFR Part 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.*

Emergency Generator for the NSPS applicable generators is defined as any stationary internal combustion engine whose operation is limited to emergency situations and required testing and maintenance. Examples include stationary engines used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary engines used to pump water in the case of fire or flood. Stationary engines used to supply power to an electric grid or that supply power as part of a financial arrangement with another entity are not considered to be emergency engines.

Additional requirements for the NSPS generators include, but are not limited to:

- The Moulton Union (outside) and Watson Ice Arena generators shall fire only diesel fuel with a maximum sulfur content not to exceed 500 ppm.
- Beginning October 1, 2010, the Moulton Union (outside) and Watson Ice Arena generators shall fire only diesel fuel with a maximum sulfur content not to exceed 15 ppm.
- The Moulton Union (outside), Watson Ice Arena, and Wellness Center generators shall be limited to 100 hr/yr of operation for maintenance checks and readiness testing. The generators shall be limited to 500 hours per year of total operation. Both of these limits are based on a 12 month rolling total. Compliance shall be demonstrated by a written log of all generator operating hours.

- The Moulton Union (outside), Watson Ice Arena, and Wellness Center generators shall be equipped with non-resettable hour meters.
- Bowdoin College shall operate and maintain the Moulton Union (outside), Watson Ice Arena, and Wellness Center generators in accordance with the manufacturer's written instructions. Bowdoin College shall not change settings that are not approved in writing by the manufacturer.

E. Facility-wide Limit Changes

This license amends the facility limits for the Central Heating Plant to 37.05 tons/year of SO_2 and non-central heating plant units to 50,000 MMBtu/yr. The generators continue to have the 500 hour per year per unit limit. Bowdoin College was previously limited to an annual heat content limit from the Central Heating Plant, a propane gallons/year limit, and generator hours/year limits.

F. Annual Emissions

Bowdoin College shall be limited to the following annual emissions, based on a 12 month rolling total, calculated from the SO_2 tons/year limit from the Central Heating Plant Units; 50,000 MMBtu/yr from the non-Central Heating Plant licensed units; and 500 hours per year per back-up generator. 500 gallons/year of waste oil is also allowed to be fired.

Total Licensed Annual Emission for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	PM_{10}	SO_2	NO_x	CO	VOC
Central Heating Plant Boilers *	8.24	8.24	37.05	30.9	8.40	0.52
Non-Central Heating Plant Boilers *	3.0	3.0	12.59	5.0	2.0	0.13
Generators						
Central Heating Plant	0.15	0.15	0.02	2.19	0.47	0.18
Chamberlain Hall	0.16	0.16	0.03	2.27	0.49	0.18
Druckenmiller Hall	0.12	0.12	0.02	1.71	0.37	0.14
Hubbard Hall	0.1	0.1	0.02	1.43	0.31	0.12
Kanbar Hall	negl.	negl.	negl.	0.61	0.05	0.02
Memorial Hall	0.14	0.14	0.02	1.99	0.43	0.16
Moulton Union	negl.	negl.	negl.	1.83	0.14	0.05
Moulton Union (outside)	0.2	0.2	0.03	2.88	0.62	0.24
Portable 1	0.08	0.08	0.01	1.13	0.24	0.09
Portable 2	0.09	0.09	0.04	3.37	0.73	0.27

Rhodes Hall	0.03	0.03	negl.	1.23	0.26	0.1
Smith Union	0.02	0.02	negl.	0.81	0.18	0.07
Stowe Hall	negl.	negl.	negl.	0.94	0.07	0.03
Thorn Dining	0.12	0.12	0.05	4.40	0.95	0.36
Walker Art Museum	negl.	negl.	negl.	1.83	0.14	0.05
Watson Ice Arena	0.12	0.12	0.02	1.72	0.37	0.14
Wellness Center	negl.	negl.	negl.	0.83	0.06	0.02

Total TPY	**12.6**	**12.6**	**49.90**	**67.07**	**16.29**	**2.87**
	PM	PM_{10}	SO_2	NO_X	CO	VOC

* Note that for fee purposes, the Central Heating Plant calculations for NO_X (boiler 3 on oil) and CO and VOC (on natural gas) were based on 206,000 MMBtu/yr. Worst case emissions factors were used for non-Central Heating Plant calculations: oil factors were used for PM, SO_2, and NO_X and natural gas factors were used for CO and VOC.

III. AMBIENT AIR QUALITY ANALYSIS

According to 06-096 CMR 115, the level of air quality analyses required for a minor modification shall be determined on a case-by-case basis. With the facility license limits, Bowdoin College is below the emissions level required for modeling and monitoring.

Pollutant	**Modeling Threshold**
PM	25
SO_2	50
NO_X	100
CO	250

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,
- 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-W-N, subject to the following conditions:

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

STANDARD CONDITIONS

(1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions (38 M.R.S.A. §347-C).

(2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115. [06-096 CMR 115]

(3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both. [06-096 CMR 115]

(4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request. [06-096 CMR 115]

(5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. §353. [06-096 CMR 115]

(6) The license does not convey any property rights of any sort, or any exclusive privilege. [06-096 CMR 115]

(7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions. [06-096 CMR 115]

(8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request. [06-096 CMR 115]

(9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license. [06-096 CMR 115]

(10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license. [06-096 CMR 115]

(11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:

A. perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
   1. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
   2. pursuant to any other requirement of this license to perform stack testing.

B. install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and

C. submit a written report to the Department within thirty (30) days from date of test completion.

[06-096 CMR 115]

(12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:

A. within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and

B. the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and

C. the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.

[06-096 CMR 115]

(13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement. [06-096 CMR 115]

(14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation. [06-096 CMR 115]

(15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status. [06-096 CMR 115]

SPECIFIC CONDITIONS

(16) **Boiler 1** (45.1 MMBtu/hr)

A. Boiler 1 shall fire #2 fuel oil which meets the requirements of ASTM D396 or biodiesel per condition (21). [06-096 CMR 115]

B. Emissions from Boiler 1 shall not exceed the following [06-096 CMR 103 and 115]:

Pollutant	lb/MMBtu	lb/hr
PM	0.08	3.6
PM_{10}	-	3.6
SO_2	-	22.7
NO_X	0.3	13.5
CO	-	1.6
VOC	-	0.06

C. Visible emissions from boiler 1 shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

D. Boiler 1 shall not be operated and shall be removed from the site once boiler 4 is installed and operating after initial start-up.

(17) **Boiler 2** (29.3 MMBtu/hr)

A. Boiler 2 shall fire #2 fuel oil which meets the requirement of ASTM D396, natural gas, or biodiesel per condition (21). [06-096 CMR 115]

B. Emissions from Boiler 2 shall not exceed the following [06-096 CMR 103 and 115]:

	Oil: #2 or biodiesel		Natural Gas
Pollutant	lb/MMBtu	lb/hr	lb/hr
PM	0.08	2.3	2.3
PM_{10}	-	2.3	2.3
SO_2	-	14.8	0.02
NO_X	0.3	8.8	2.8
CO	-	1.1	2.4
VOC	-	0.04	0.2

C. Bowdoin College shall comply with the notification and reporting requirements of 40 CFR Part 60, Subpart Dc, for boiler 2 including but not limited to, fuel records and semi-annual reporting. [40 CFR Part 60, Subpart Dc]

D. Visible emissions from boiler 2 when firing fuel oil shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

E. Visible emissions from boiler 2 when firing natural gas shall not exceed an opacity of 10% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

F. Boiler 2 shall not be operated and shall be removed from the site once boiler 4 is installed and operating after initial start-up.

(18) **Boiler 3** (48.8 MMBtu/hr oil; 51.3 MMBtu/hr nat'l gas)

A. Boiler 3 shall fire #2 fuel oil which meets the requirement of ASTM D396, natural gas, or biodiesel per condition (21). [06-096 CMR 115]

B. Emissions from Boiler 3 shall not exceed the following [06-096 CMR 103 and 115]:

Pollutant	Oil: #2 or biodiesel		Natural Gas
	lb/MMBtu	lb/hr	lb/hr
PM	0. 08	3.9	6.22
PM_{10}	-	3.9	6.22
SO_2	-	24.6	0.03
NO_X	0.3	14.6	5.03
CO	-	1.7	4.22
VOC	-	0.07	0.28

C. Visible emissions from boiler 3 when firing fuel oil shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

D. Visible emissions from boiler 3 when firing natural gas shall not exceed an opacity of 10% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

(19) **Boiler 4** (70.0 MMBtu/hr)

A. Boiler 4 shall fire #2 fuel oil which meets the requirement of ASTM D396, biodiesel, or natural gas per condition (21). [06-096 CMR 115]

B. Emissions from Boiler 4 shall not exceed the following [06-096 CMR 103 and 115 BACT, and 40 CFR Part 60, Subpart Dc]:

Pollutant	Oil: #2 or biodiesel		Nat'l Gas
	lb/MMBtu	lb/hr	lb/hr
PM	0.08	5.6	5.6
PM_{10}	-	5.6	5.6
SO_2	-	35.3	0.04
NO_X	0.2	14.0	6.80
CO	-	2.5	5.71
VOC	-	0.1	0.37

C. Bowdoin College shall operate Boiler 4 with a low NO_X burner and flue gas recirculation. [06-096 CMR 115, BACT]

D. Bowdoin College shall comply with the initial performance testing, notification, and reporting requirements of 40 CFR Part 60, Subpart Dc, including but not limited to, opacity performance testing, maintaining fuel records, and semi-annual reporting. [40 CFR Part 60, Subpart Dc]

E. Visible emissions from boiler 4 shall be limited to no greater than 20% opacity on a six (6) minute average, except for one (1) six (6) minute period per hour of not more than 27% opacity. [40 CFR Part 60, Subpart Dc]

(20) **Ancillary Boilers and Water Heaters**

A. The small boilers/hot water heaters shall not exceed the following emission limits while firing the listed allowable fuels:

Unit/Fuel Type	PM (lb/MMBtu)	Origin and Authority
Brunswick Apartments (4.2 MMBtu/hr) #2 fuel oil, biodiesel, nat'l gas	0.08	06-096 CMR 115, BACT
Brunswick Apartments (4.2 MMBtu/hr) #2 fuel oil, biodiesel, nat'l gas	0.08	06-096 CMR 115, BACT
Thorn Hall (3.2 MMBtu/hr) nat'l gas	0.08	06-096 CMR 115, BACT

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Admin. Blg. (1.2 MMBtu/hr) #2 fuel, biodiesel	0.1	0.1	0.6	0.24	0.04	negl.
Brunswick Apts (4.2 MMBtu/hr) #2 fuel, biodiesel	0.34	0.34	2.1	0.84	0.15	0.01
nat'l gas	0.34	0.34	negl.	0.41	0.34	0.02
Brunswick Apts (4.2 MMBtu/hr) #2 fuel, biodiesel	0.34	0.34	2.1	0.84	0.15	0.01
nat'l gas	0.34	0.34	negl.	0.41	0.34	0.02
Chamberlain Hall (1.6 MMBtu/hr) nat'l gas	0.13	0.13	negl.	0.16	0.13	0.01

Coffin St. Dorm West (1.0 MMBtu/hr) nat'l gas	0.08	0.08	negl.	0.1	0.082	0.01
Farley Field House (2.5 MMBtu/hr) nat'l gas	0.2	0.2	negl.	0.24	0.20	0.013
MacMillan House (1.3 MMBtu/hr) #2 fuel or biodiesel	0.10	0.10	0.65	0.26	0.05	negl.
Moulton Union (1.2 MMBtu/hr) nat'l gas	0.10	0.10	negl.	0.12	0.1	0.01
Smith Union (2.5 MMBtu/hr) propane	0.19	0.19	negl.	0.35	0.2	0.03
Stowe Hall (1.0 MMBtu/hr) nat'l gas	0.08	0.08	negl.	0.1	0.08	0.01
Thorn Hall (3.2 MMBtu/hr) nat'l gas	0.26	0.26	negl.	0.31	0.26	0.02
Watson Ice Arena (2.0 MMBtu/hr) nat'l gas	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena (2.0 MMBtu/hr) nat'l gas	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena (2.0 MMBtu/hr) nat'l gas	0.16	0.16	negl.	0.19	0.16	0.01
Watson Ice Arena (1.5 MMBtu/hr) nat'l gas	0.12	0.12	negl.	0.15	0.12	0.01
Wellness Center (2.0 MMBtu/hr) nat'l gas	0.16	0.16	negl.	0.19	0.16	0.01

[06-096 CMR 115]

B. Visible emissions from the #2 fuel oil and biodiesel fired units shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

C. Visible emissions from the propane and natural gas fired units shall not exceed an opacity of 10% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 3-hour period. [06-096 CMR 101]

(21) **Facility and Fuel Limits**

A. Central Heating Plant
1. Bowdoin College shall be limited to 37.05 tons/yr SO_2 from the Central Heating Plant Boilers (boilers 1-4) on a 12 month rolling total.
2. Bowdoin College shall keep fuel records documenting the amount and type of fuel (#2 fuel oil, biodiesel, natural gas) fired on a monthly and 12 month

rolling total basis, and the calculations documenting compliance with the tons/yr limit.

3. The sulfur content of the fuel fired in the Central Heating Plant (boilers 1-4) shall not exceed the requirements of ASTM D396. Fuel records shall be kept documenting the percent sulfur of the fuel. Sulfur content of the fuel shall be based on a 30 day rolling average, as allowed for in 40 CFR Part 60, Subpart Dc. The calculation shall be the average sulfur of fuel deliveries received during any consecutive 30 day period.

B. Non-Central Heating Plant Units

1. Bowdoin College shall be limited to 50,000 MMBtu/yr for the non-Central Heating Plant licensed units on a 12 month rolling total.
2. Bowdoin College shall keep fuel records documenting the amount and type of fuel (#2 fuel oil, biodiesel, natural gas, propane) fired on a monthly and 12 month rolling total basis, and the calculations documenting compliance with the 50,000 MMBtu/yr limit.
3. The sulfur content of the fuel fired in the non-Central Heating Plant boilers and heaters shall meet the requirements of ASTM D396.

C. Waste Oil

Bowdoin College may combust up to a total of 500 gallons/year of specification waste oil generated on site, based on a 12 month rolling total. Bowdoin College shall maintain records of the amount of specification waste oil burned in the boilers and shall have, on-site, a copy of the results of a representative test sample of the waste oil. [06-096 CMR 115 and 06-096 CMR 860]

(22) **Back-Up Generators**

A. The licensed back-up generators shall each be limited to 500 hours per year, based on a 12 month rolling total. Hour meters shall be maintained and operated on each of the back-up generators. [06-096 CMR 115, BPT]

B. The back-up generators shall only be operated for maintenance purposes and for situations arising from sudden and reasonably unforeseeable events beyond the control of the source. The back-up generators shall not be used for prime power when reliable offsite power is available. A log shall be maintained documenting the date, time, and reason for operation. [06-096 CMR 115, BPT]

C. The diesel fuel oil fired in the diesel back-up generators shall not exceed 0.05% sulfur by weight. Compliance shall be based on fuel records from the supplier showing the quantity of fuel delivered and the percent sulfur of the fuel. [06-096 CMR 115, BPT]

D. The back-up generators shall not exceed the following emission limits firing the allowed fuels listed:

Unit	PM (lb/MMBtu)	Origin and Authority
Thorn Dining	0.12	06-096 CMR 103
Portable 2	0.12	06-096 CMR 103

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 (2.0 MMBtu/hr) diesel, 0.05%	0.62	0.62	0.10	8.76	1.89	0.72
Chamberlain Hall (2.1 MMBtu/hr) diesel, 0.05%	0.64	0.64	0.10	9.06	1.95	0.74
Druckenmiller Hall (1.5 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.08	6.83	1.47	0.56
Hubbard Hall (1.3 MMBtu/hr) diesel, 0.05%	0.40	0.40	0.07	5.74	1.24	0.47
Kanbar Hall (0.6 MMBtu/hr) nat'l gas	0.01	0.01	negl.	2.42	0.19	0.07
Memorial Hall (1.8 MMBtu/hr) diesel, 0.05%	0.56	0.56	0.09	7.98	1.72	0.65
Moulton Union (1.8 MMBtu/hr) nat'l gas	0.02	0.02	negl.	7.31	0.57	0.21
Mouton Union (outside) (2.8 MMBtu/hr) diesel, 0.05%	0.81	0.81	0.13	11.54	2.49	0.94
Portable 1 (1.0 MMBtu/hr) diesel, 0.05%	0.32	0.32	0.05	4.53	0.98	0.37
Portable 2 (3.1 MMBtu/hr) diesel, 0.05%	0.37	0.37	0.15	13.47	2.90	1.10
Rhodes Hall (1.1 MMBtu/hr) propane	0.13	0.13	negl.	4.91	1.06	0.40
Smith Union (0.7 MMBtu/hr) propane	0.09	0.09	negl.	3.25	0.70	0.27
Stowe Hall (0.9 MMBtu/hr) nat'l gas	0.01	0.01	negl.	3.77	0.29	0.11
Thorn Dining (4.0 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.20	17.58	3.79	1.44

Walker Art Museum (1.8 MMBtu/hr) nat'l gas	0.02	0.02	negl.	7.31	0.57	0.21
Watson Ice Arena (1.6 MMBtu/hr) diesel, 0.05%	0.48	0.48	0.08	6.89	1.48	0.56
Wellness Center (0.8 MMBtu/hr) nat'l gas	0.01	0.01	negl.	3.32	0.26	0.1

[06-096 CMR 115, BPT]

E. Visible emissions from each of the diesel back-up generators shall not exceed 20% opacity on a 6 minute block average, except for no more than two (2) six (6) minute block averages in a 3 hour period. [06-096 CMR 101]

F. Visible emissions from each of the natural gas and propane back-up generators shall not exceed 10% opacity on a 6 minute block average, except for no more than two (2) six (6) minute block averages in a 3 hour period. [06-096 CMR 1115, BPT]

G. NSPS for the Moulton Union (outside) and Watson Ice Arena Diesel Generators
   1. The Moulton Union (outside) and Watson Ice Arena diesel generators shall fire only diesel fuel with a maximum sulfur content not to exceed 500 ppm. [40 CFR 60.4207(a)]
   2. Beginning October 1, 2010, the Moulton Union (outside) and Watson Ice Arena generators shall fire only diesel fuel with a maximum sulfur content not to exceed 15 ppm. [40 CFR 60.4207(b)]
   3. The Moulton Union (outside) and Watson Ice Arena generators shall be limited to 100 hr/yr of operation for maintenance checks and readiness testing. The generators shall be limited to 500 hours per year of total operation. Both of these limits are based on a 12 month rolling total. Compliance shall be demonstrated by a written log of all generator operating hours. [40 CFR 60.4211(E) and 06-096 CMR 115, BACT]
   4. The Moulton Union (outside) and Watson Ice Arena generators shall be equipped with a non-resettable hour meter. [40 CFR 60.4209(a)]
   5. The Moulton Union (outside) and Watson Ice Arena generators are subject to PM, CO, and NO_x + VOC emission requirements set forth in 40 CFR 60, Subpart IIII. Compliance with these emission requirements shall be demonstrated by certification from the manufacturer that this engine class meets the appropriate Tier standards. [40 CFR 60, Subpart IIII]
   6. Bowdoin College shall meet all requirements of 40 CFR Part 60, Subpart IIII for the Moulton Union (outside) and Watson Ice Arena generators.

H. NSPS for the Wellness Center Generator

1. The Wellness Center Generator shall be limited to 100 hr/yr of operation for maintenance checks and readiness testing. The generator shall be limited to 500 hours per year of total operation. Both of these limits are based on a 12 month rolling total. Compliance shall be demonstrated by a written log of all generator operating hours. [40 CFR 60.4243(d) and 06-096 CMR 115, BACT]
2. The Wellness Center generator shall be equipped with a non-resettable hour meter. [40 CFR 60.4237 and 06-096 CMR 115, BACT]
3. The Wellness Center generator is subject to emission requirements set forth in 40 CFR 60, Subpart JJJJ. Compliance with these emission requirements shall be demonstrated by certification from the manufacturer. [40 CFR 60, Subpart JJJJ]
4. Bowdoin College shall meet all requirements of 40 CFR Part 60, Subpart JJJJ for the Wellness Center generator.

(23) **Fugitive Emissions**

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen (15)-second opacity observations which exceed 20% in any one (1) hour. [06-096 CMR 101]

(24) **Annual Emission Statement**

In accordance with *Emission Statements*, 06-096 CMR 137 (last amended November 8, 2008), the licensee shall annually report to the Department the information necessary to accurately update the State's emission inventory by means of:

1) A computer program and accompanying instructions supplied by the Department; or
2) A written emission statement containing the information required in 06-096 CMR 137.

The emission statement must be submitted as specified by the date in 06-096 CMR 137.

(25) Bowdoin College shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (38 M.R.S.A. §605).

DONE AND DATED IN AUGUSTA, MAINE THIS 6th DAY OF November, 2009.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: James P. Brooks
DAVID P. LITTELL, COMMISSIONER

The term of this license shall be five (5) years from the signature date above.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: September 8, 2009
Date of application acceptance: September 10, 2009

Date filed with the Board of Environmental Protection: _____

This Order prepared by Kathleen E. Tarbuck, Bureau of Air Quality.

FILED
NOV - 9 2009
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE