



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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GOVERNOR

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COMMISSIONER

**Northern Maine Community College
Aroostook County
Presque Isle, Maine
A-444-71-H-A**

**Departmental
Findings of Fact and Order
Air Emission License**

After review of the air emissions license application, 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

Northern Maine Community College (NMCC) of Presque Isle, Maine has applied to amend their Air Emission License permitting the operation of emission sources associated with their educational facility.

NMCC has requested to install a new wood-fired boiler with a maximum design heat input capacity of 3.6 MMBtu/hr. The new boiler will provide heating to the school's buildings and classrooms and will replace an existing oil-fired unit of similar size.

B. Emission Equipment

The following is addressed by this air emissions license amendment:

New Biomass Boiler

Unit Identification	Heat Input Capacity (MMBtu/hr)	Fuel Type / %Sulfur	Max. Firing Rate (tons/hr)	Stack #	Status
Boiler B-800-1	3.6	Wood pellets	~0.27 *	1	New

* Based on net heating value for pellets of 13.6 MMBtu/ton

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04679-2094
(207) 764-0477 FAX: (207) 760-3143

C. Application Classification

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 regulations. The emission increases are determined by subtracting the current licensed emissions preceding the modification from the maximum future licensed allowed emissions, as follows:

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Sig. Level
PM	2.1	6.9	4.8	100
PM ₁₀	2.1	6.9	4.8	100
SO ₂	8.82	9.2	0.4	100
NO _x	5.25	8.8	3.6	100
CO	0.63	10.1	9.5	100
VOC	0.05	0.4	0.3	50

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

D. Regulatory Review

Provided in this section is a summary of State and Federal air regulations that apply to the proposed biomass boiler at NMCC. The school currently utilizes and has selected specific equipment that will achieve full compliance with the following State and Federal air regulations.

06-096 CMR 101 Visible Emission Regulation

This rule establishes opacity limits from various sources of air contaminants. The new biomass boiler is subject to Section (2)(B)(1)(e), which limits visible emissions from any wood waste or biomass units to an opacity of 30 percent on a six (6) minute block average basis, except for no more than two (2) six (6) minute block averages in a 3-hour period.

The general process sources located on NMCC's campus are subject to Section (2)(B)(3)(d), which limits visible emissions from general process sources to an opacity of 30 percent on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period.

06-096 CMR 103 Fuel Burning Equipment Particulate Emission Standard

This rule applies to all fuel burning or solid waste fuel burning equipment having a rated capacity of 3 MMBtu/hr or greater. Because the new biomass boiler has a rated capacity greater than 3 MMBtu/hr but less than 50 MMBtu/hr, it is subject to Section (2)(B)(4)(a) which limits any biomass boiler to a PM emission rate of 0.30 pounds of particulate per million BTU.

06-096 CMR 115 Major and Minor Source Air Emission License Regulation

This rule specifies who must obtain an air emission license, describes the information an applicant must submit for a license, and describes the standards and criteria that must be complied with during and following the air licensing process. For minor sources such as NMCC, 06-096 CMR 115 (as amended) serves as an operating licensing program and a pre-construction license review program.

Federal Air Regulations

New Source Performance Standards (NSPS)

40 CFR Part 60 Subpart Dc – NMCC's existing boilers and new wood-fired unit are rated below 10 MMBtu/hr and therefore are not subject to the New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, for units greater than 10 MMBtu/hr manufactured after June 9, 1989.

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR Part 63 Subpart JJJJJJ – National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources. NMCC new biomass unit is subject to this federal regulation, however, there are no emission limits that apply. The applicable requirements are described in the (Best Practical Treatment Analysis) Section II.

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 (as amended).

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 *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. New Boiler

Boiler Description and Design

Northern Maine Community College (NMCC) located in Presque Isle, Maine is proposing to install a new 3.6 MMBtu/hr biomass boiler that will utilize wood pellets as the fuel source. NMCC is currently licensed to operate eight (8) #2 fuel oil fired boilers, several parts washers, two spray booths in the auto body shop, and lists several insignificant units including small boilers and a waste oil burner in their plumbing and heating classroom. The current air emissions license limits the facility-wide total fuel use to 250,000 gallons per year of ASTM D396 compliant #2 fuel oil. NMCC is not requesting to modify its fuel cap.

The new wood-fired boiler will provide basic heating to the Mailman Trades Building and nearby Christie Complex which are the administrative facilities and classroom space for the campus. As part of this modification, NMCC plans to remove existing oil fired boiler B-800 (3.5 MMBtu/hr) as listed on the facility's air emission license. The new biomass boiler system will be installed in the Mailman Trades Building. Because the biomass boiler will utilize wood pellets which are produced in Maine, a significant oil load will be replaced with a locally produced energy resource. The biomass boiler will utilize wood pellets and has a maximum design heat input capacity of approximately 3.6 MMBtu/hr and an energy output of 900 kW. No auxiliary fuels are required for the startup of this unit which uses an electronic igniter that blows hot air into the combustion chamber to ignite the wood on a cold start.

Wood pellets are housed in covered storage bins adjacent to the biomass boiler room. The scraper floor extraction system (walking floor) transports pellets into the cross conveyor auger. The cross conveyor auger transports the fuel to the conveyor auger which transports the fuel to the in-feed auger of the boiler. The fuel extraction system is completely sealed and will not generate exterior dust emissions. The biomass boiler uses a burner trough with an attached external grate and a moving annealing grate to achieve optimal combustion. A feed auger moves the wood fuel into the burner trough where the fuel is pre-dried and

gasified under controlled primary air. Controlled secondary air is injected to fully combust the syngas and thermal energy is released into the boiler's heat exchanger. The flue gas will pass through a cyclone separator to remove larger particles and ash and to reduce PM emissions. Bottom ash from the process is automatically transported by an auger out of the boiler into a de-ashing bin. Fly ash is collected from the cyclone separator in separate bins.

Best Available Control Technology (BACT)

Particulate Matter (PM)

A detailed BACT analysis for PM can be found in NMCC's December 2011 amendment application. The BACT analysis reviewed several potential control technologies for PM emissions from biomass boilers which include add on pollution control equipment such as wet scrubbers, electrostatic precipitators (ESPs), and fabric filters. These technologies were determined not to be economically or technically feasible for NMCC. Multicyclone technology was chosen for particulate control BACT. Multicyclones use inertia to separate PM from the gas stream. The gas stream enters the cyclone and spirals around the inside of the cyclone forcing particles with greater inertia to the outside wall where they encounter a boundary layer of gas and fall down the cone to a collection hopper below. The efficiency of this arrangement varies from 25 to 65 percent. NMCC's biomass boiler will be fitted with a cyclone to control particulate emissions which represents the highest level of control for boilers of this size. Therefore, NMCC proposes that meeting an emissions limit of 0.25 lb PM/MMBtu with the use of a cyclone represents BACT for the biomass boiler.

Sulfur Dioxide (SO₂)

Sulfur Dioxide is formed during combustion from sulfur in the fuel. Pollution control options to reduce the emissions of SO₂ include spray dryer absorbers, wet scrubbers, and dry sorbent injection followed by either a fabric filter or an ESP. The costs of a wet scrubbing system for a relatively small boiler, including the associated annual operating cost for caustic, energy, operation and maintenance does not make these options economically feasible. Wood pellets have an inherently low sulfur content (even negligible), therefore to meet BACT, NMCC will burn only wood pellets and will meet an emission limit of 0.09 lb/hr based on AP-42 data in Table 1.6-2.

Nitrogen Oxides (NO_x)

There are several potential control technologies for NO_x emissions from boilers including add-on controls such as selective catalytic reduction (SCR) and

selective non-catalytic reduction (SNCR), and combustion control techniques such as staged combustion, low excess air firing, and flue gas recirculation. Due to the relatively small size of the proposed biomass boiler, the use of add-on control technologies is not economically feasible. NMCC will use good combustion control practices and will meet an emission limit of 0.8 lb/hr based on AP-42 data in Table 1.6-2 to meet BACT for the proposed boiler.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs)

Incomplete combustion can occur as a result of either insufficient residence time or limited oxygen availability during combustion. Both carbon monoxide (CO) and volatile organic compounds (VOCs) can result from incomplete combustion. However, because the proposed wood fired boiler is relatively small, it is not economically feasible to install add-on pollution control equipment for CO and VOC emission control.

NMCC will operate the new unit with proper maintenance and within manufacturer's specified settings. NMCC proposes good combustion efficiency and maintenance practices and meeting an emission limit of 2.17 lb/hr for CO and 0.06 lb/hr VOC based on AP-42 data in Table 1.6-2 represent BACT for the biomass boiler.

BACT Summary

NMCC is proposing the use of a multicyclone and good combustion practices to reduce NO_x, PM, CO, and VOC emissions from the biomass boiler. The use of wood pellets, which are inherently low in sulfur, will minimize SO₂ emissions. NMCC will meet the following BACT emission limits for the new biomass boiler.

BACT Emission Limits

Pollutant	Emission Limit [lb/hr]	Emission Limit [lb/MMBtu]
PM/PM ₁₀	0.1	0.25
SO ₂	0.1	--
NO _x	0.8	--
CO	2.2	--
VOC	0.1	--

1. Total tpy emissions from the new unit is based on a maximum of 8760 hours per year of operation, therefore, there is no tons per year wood limit.

2. Fuel Burning Equipment Particulate Emission Standard, 06-096 CMR 103 (as amended) regulates PM emission limits. The PM₁₀ limits are derived from the PM limits. The PM and PM₁₀ BACT emission limits are more stringent.
3. NMCC shall continuously operate the multi-cyclone on wood pellet boiler when the unit is in operation. The multi-cyclone is required to meet the 0.25 lb/MMBtu BACT particulate emission limit.
4. SO₂, NO_x, CO, and VOC emission limits are based upon AP-42 data dated 9/08.
5. Visible emissions from the wood-fired unit shall not exceed 30% opacity on a six (6) minute block average, except for no more than two (2) six (6) minute block averages in a continuous 3-hour period.

40 CFR Part 63 Subpart JJJJJ

The existing oil-fired boilers and new wood fired unit are subject to the *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources* (40 CFR Part 63 Subpart JJJJJ). The units are considered boilers rated less than 10 MMBtu/hr that do not combust coal.

For informational purposes, a summary of the current applicable federal 40 CFR Part 63 Subpart JJJJJ requirements is listed below. At this time, the Maine Department of Environmental Protection has not taken delegation of this area source MACT (Maximum Achievable Control Technology) rule promulgated by EPA, however NMCC is still subject to the requirements. Notification forms and additional rule information can be found on the following website: <http://www.epa.gov/ttn/atw/boiler/boilerpg.html>.

a. Compliance Dates, Notifications, and Work Practice Requirements

i. Initial Notification of Compliance

An Initial Notification submittal to EPA was due on September 17, 2011. [40 CFR Part 63.11225(a)(2)], for the new wood pellet boiler - within 120 days after the source becomes subject to the standard.

ii. Boiler Tune-Up Program – Initial and Biennial

(a) A boiler tune-up program shall be implemented to include the tune-up of applicable boilers by March 21, 2012. [40 CFR Part 63.11196(a)(1)]

(b) The boiler tune-up program, conducted to demonstrate continuous compliance, shall be performed as specified below:

1. As applicable, inspect the burner, and clean or replace any component of the burner as necessary. Delay of the burner inspection until the next scheduled shutdown is permitted;

- however, the burner must be inspected at least once every 36 months. [40 CFR Part 63.11223(b)(1)]
2. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern, consistent with the manufacturer's specifications. [40 CFR Part 63.11223(b)(2)]
 3. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure it is correctly calibrated and functioning properly. [40 CFR Part 63.11223(b)(3)]
 4. Optimize total emissions of CO, consistent with manufacturer's specifications. [40 CFR Part 63.11223(b)(4)]
 5. Measure the concentration in the effluent stream of CO in parts per million (ppm), by volume, and oxygen in volume percent, before and after adjustments are made. [40 CFR Part 63.11223(b)(5)]
 6. If a unit is not operating on the required date for a tune-up, the tune-up must be conducted within one week of start-up. [40 CFR Part 63.11223(b)(7)]
- (c) A Notification of Compliance Status shall be submitted to EPA no later than 120 days after conducting the initial boiler tune-up. [40 CFR Part 63.11225(a)(4) and 40 CFR Part 63.11214(b)]
- (d) The facility shall implement a biennial boiler tune-up program after the initial tune-up and initial compliance report has been submitted.
1. Each biennial tune-up shall be conducted no more than 25 months after the previous tune-up. [40 CFR Part 63.11223(a)]
 2. The biennial report shall be maintained onsite and submitted to EPA, if requested. The report shall contain the concentration of CO in the effluent stream (ppmv) and oxygen in volume percent, measured before and after the boiler tune-up, a description of any corrective actions taken as part of the tune-up of the boiler, and the type and amount of fuel used over the 12 months prior to the biennial tune-up of the boiler. [40 CFR Part 63.11223(b)(6)] The biennial compliance report shall also include the company name and address; a compliance statement signed by a responsible official certifying truth, accuracy, and completeness; and a description of any deviations and corrective actions. [40 CFR Part 63.11225(b)]

b. Recordkeeping

Records shall be maintained consistent with the requirements of 40 CFR Part 63 Subpart JJJJJJ including the following [40 CFR Part 63.11225(c)]: copies of notifications and reports with supporting compliance

documentation; identification of each boiler, the date of tune-up, procedures followed for tune-up, and the manufacturer's specifications to which the boiler was tuned; documentation of fuel type(s) used monthly by each boiler; the occurrence and duration of each malfunction of the boiler; and actions taken during periods of malfunction to minimize emissions and actions taken to restore the malfunctioning boiler to its usual manner of operation. Records shall be in a form suitable and readily available for expeditious review.

C. Annual Emissions

NMCC shall be restricted to the following annual emissions, based on 250,000 gallons per year (calendar year basis) for oil and maximum operation of 8760 hours per year for new wood pellet boiler.

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

	PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Oil-fired Boilers	2.1	2.1	8.8	5.3	0.6	0.1
Wood-fired Boiler	4.8	4.8	0.4	3.5	9.5	0.3
Total TPY	6.9	6.9	9.2	8.8	10.1	0.4

III. AMBIENT AIR QUALITY ANALYSIS

According to 06-096 CMR 115 (as amended), the level of air quality analyses required for a minor source amendment shall be determined on a case-by case basis. Based on the information available in the file, and the similarity to existing sources, Maine Ambient Air Quality Standards (MAAQS) will not be violated by this source.

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, or increment standards either alone or in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-444-71-H-A, subject to the conditions found in Air Emissions License, A-444-71-F-R/A, subsequent amendments, and 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.

SPECIFIC CONDITIONS

The following conditions are new to Air Emission License, A-444-71-F-R/A:

(1) Boiler B-800-1

- A. NMCC is licensed to install and operate a new wood pellet boiler with a maximum design heat input capacity rated at 3.6 MMBtu/hr. [06-096 CMR 115, BACT]
- B. NMCC shall operate a multi-cyclone to control particulate emissions from Boiler B-800-1 whenever the boiler is in operation. [06-096 CMR 115, BACT]
- C. Emissions shall not exceed the following:

Emission Unit	Pollutant	lb/MMBtu	Origin and Authority
Boiler B-800-1	PM	0.25	06-096 CMR, BACT

Emissions shall not exceed the following: [06-096 CMR 115, BACT]:

Emission Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Boiler B-800-1	0.9	0.9	0.1	0.8	2.2	0.1

- D. Visible emissions from Boiler B-800-1 shall not exceed 30% opacity on a six (6) minute block average, except for no more than two (2) six (6) minute block averages in a continuous 3-hour period. [06-096 CMR 101]
- E. Ash from Boiler B-800-1 shall be disposed of in accordance with the Bureau of Remediation and Waste Management (BRWM). Ash shall be sufficiently conditioned with water or transported in covered containers so as to prevent fugitive emissions. [06-096 CMR 115, BACT]

- (2) NMCC shall notify the Department in writing within 5 days of startup and shall develop and submit for approval by the Department a best management practice (BMP) plan for the control and minimization of particulate matter emissions from Boiler B-800-1. The BMP plan shall be developed and submitted to the Department no later than 120 days after start-up. Upon the Department's approval of the BMP plan, NMCC shall adhere to the commitments made in the BMP plan. [06-096 CMR 115, BACT]
- (3) **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]
- (4) **General Process Sources**
Visible emissions from any general process source 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 1-hour period. [06-096 CMR 101]

DONE AND DATED IN AUGUSTA, MAINE THIS 8th DAY OF March, 2012.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Melanie Lygier
PATRICIA W. AHO, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-444-71-F-R/A.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 2, 2011

Date of application acceptance: December 16, 2011

Date filed with the Board of Environmental Protection:

This Order prepared by Edwin Cousins, Bureau of Air Quality

