

**University of Southern Maine
Cumberland County
Gorham, Maine
A-462-71-L-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

The University of Maine System was issued Air Emission License A-462-71-K-R/M on April 13, 2004, permitting the operation of emission sources associated with the Gorham Campus of the University of Southern Maine (USM).

USM has requested an amendment to their License to add three boilers and an emergency generator to service a new residence hall. This amendment will also address the change from #2 fuel oil with a sulfur content not to exceed 0.35%, to #2 fuel oil which meets the criteria of ASTM D396.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Existing Fuel Burning Equipment

<u>Equipment</u>	<u>Maximum Capacity (MMBtu/hr)</u>	<u>Firing Rate</u>	<u>Fuel Type</u>	<u>Stack #</u>
Boiler #1	20.90	149.3 gal/hr 20,490 scf/hr	#2 fuel oil Natural gas	1
Boiler #2	20.90	149.3 gal/hr 20,490 scf/hr	#2 fuel oil Natural gas	2
Boiler #3	6.30	45.0 gal/hr 6176.5 scf/hr	#2 fuel oil Natural gas	3

New Fuel Burning Equipment

<u>Equipment</u>	<u>Maximum Capacity (MMBtu/hr)</u>	<u>Firing Rate</u>	<u>Fuel Type</u>	<u>Stack #</u>
Boiler #5	3.75	26.8 gal/hr 3644.5 scf/hr	#2 fuel oil Natural gas	8
Boiler #6	3.75	26.8 gal/hr 3644.5 scf/hr	#2 fuel oil Natural gas	8
Boiler #7	3.12	22.3 gal/hr 3024.0 scf/hr	#2 fuel oil Natural gas	8
Emergency Generator #4	0.546	535 scf/hr	Natural gas	9

C. Application Classification

A new emission unit at a minor source is considered a major modification based on whether or not expected emission increases exceed the “Significant Emission Levels” as defined in the Department’s regulations. This modification is determined to be a minor modification and has been processed as such.

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 Chapter 100 of the Department’s regulations. 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:

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

B. Boilers #1, #2, and #3

Boilers #1 and #2 each have a maximum design capacity of 20.9 MMBtu/hr and were installed in 1969. Boiler #3 has a maximum design capacity of 6.3 MMBtu/hr. Therefore, boilers #1, #2 and #3 are not subject to the New Source Performance Standards (NSPS) Subpart Dc for steam generating units greater than 10 MMBtu/hr manufactured after June 9, 1989.

A summary of the BPT analysis for Boilers #1, #2 and #3 is the following:

1. Chapter 106 regulates fuel sulfur content. However the use of natural gas or #2 fuel oil which meets the criteria in ASTM D396, is more stringent and shall be considered BPT.
2. Chapter 103 regulates PM emission limits. However, the PM limits of 0.05 lb/MMBtu when firing Natural Gas and 0.08 lb/MMBtu when firing #2 fuel oil are more stringent and shall be considered BPT.
3. SO₂ emission limits are based a mass balance when firing #2 fuel oil, and AP-42 data dated 07/98 when firing natural gas:
4. NO_x, CO and VOC emission limits are based on AP-42 data dated 09/98 and 7/98 for the combustion of fuel oil and natural gas respectively.
 - NO_x - #2 Fuel Oil – 20 lb NO_x/1000 gal
Natural Gas – 100 lb/MMscf
 - CO - #2 Fuel Oil – 5 lb CO/1000 gal
Natural Gas – 84 lb CO/MMscf
 - VOC - #2 Fuel Oil – 0.556 lb VOC/1000 gal
Natural Gas – 5.5 lb VOC/MMscf
5. When firing #2 fuel oil, visible emissions from boilers #1, #2 and #3 shall each not exceed 20% opacity on a six (6) minute block average.
6. When firing Natural Gas, visible emissions from boilers #1, #2 and #3 shall each not exceed 10% opacity on a six (6) minute block average.

C. Boilers #5, #6, and #7

Boilers #5 and #6 each have a maximum design capacity of 3.75 MMBtu/hr. Boiler #7 has a maximum design capacity of 3.12 MMBtu/hr. Therefore, boilers #5, #6 and #7 are not subject to the New Source Performance Standards (NSPS) Subpart Dc for steam generating units greater than 10 MMBtu/hr manufactured after June 9, 1989.

A summary of the BACT analysis for Boilers #5, #6 and #7 is the following:

1. Chapter 106 regulates fuel sulfur content. However the use of natural gas or #2 fuel oil which meets the criteria in ASTM D396, is more stringent and shall be considered BACT.
2. Chapter 103 regulates PM emission limits. However, the PM limits of 0.05 lb/MMBtu when firing Natural Gas and 0.08 lb/MMBtu when firing #2 fuel oil are more stringent and shall be considered BACT.
3. SO₂ emission limits are based a mass balance when firing #2 fuel oil, and AP-42 data dated 07/98 when firing natural gas:
4. NO_x, CO and VOC emission limits are based on AP-42 data dated 09/98 and 7/98 for the combustion of fuel oil and natural gas respectively.
 - NO_x - #2 Fuel Oil – 20 lb NO_x/1000 gal
Natural Gas – 100 lb/MMscf
 - CO - #2 Fuel Oil – 5 lb CO/1000 gal
Natural Gas – 84 lb CO/MMscf
 - VOC - #2 Fuel Oil – 0.556 lb VOC/1000 gal
Natural Gas – 5.5 lb VOC/MMscf
5. When firing #2 fuel oil, visible emissions from the combined stack serving boilers #5, #6 and #7 shall not exceed 20% opacity on a six (6) minute block average.
6. When firing Natural Gas, visible emissions from the combined stack serving boilers #5, #6 and #7 shall not exceed 10% opacity on a six (6) minute block average.

D. Emergency Generator #4

Emergency generator #4 has a maximum rated capacity of 0.55 MMBtu/hr.

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. Back-up generators are not to be used for prime power when reliable offsite power is available.

A summary of the BACT analysis for Emergency Generator #4 is the following:

1. Emergency generator #4 shall be limited to 500 hr/yr of operation based on a 12 month rolling total. Compliance shall be demonstrated by a written log of all generator operating hours.
2. 06-096 CMR 106 regulates fuel sulfur content. However, the use of natural gas is more stringent and shall be considered BACT.
3. A PM emission limit of 0.05 lb/MMBtu shall be considered BACT. The PM₁₀ limits are derived from the PM limits.

4. NO_x, CO, and VOC emission limits are based upon AP-42 data dated 08/2000.
5. Visible emissions from emergency generator #4 shall not exceed 10% opacity on a six (6) minute block average, except for no more than one (1), six (6) minute block average in a continuous 3-hour period

E. Fuel Use Limits and Annual Emissions

USM shall be restricted to the following fuel use limits and annual emissions, each based on a 12 month rolling total:

1. Boilers #1, #2, and #3 shall be limited to 600,000 gallons of #2 fuel oil which meets the criteria in ASTM D396, on a 12 month rolling total.
2. Boilers #1, #2, and #3 shall be limited to 92,000,000 scf of natural gas on a 12 month rolling total.
3. Boilers #5, #6, and #7 shall be limited to 65,000 gallons of #2 fuel oil which meets the criteria in ASTM D396, on a 12 month rolling total.
4. Boilers #5, #6, and #7 shall be limited to 9,000,000 scf of natural gas on a 12 month rolling total.
5. EmGen #1, #2 (firing diesel fuel, 0.05% S), #3 and #4 (firing natural gas) shall be limited to 500 hours of operation each.

Total Licensed Annual Emission for the Facility

Tons/year

(used to calculate the annual license fee)

	PM	PM₁₀	SO₂	NO_x	CO	VOC
Boilers #1, #2, #3						
#2 Fuel Oil	3.36	3.36	21.15	6.00	1.50	0.17
Natural Gas	2.35	2.35	0.03	4.60	3.86	0.25
Boilers #5, #6, #7						
#2 fuel oil	0.36	0.36	2.29	0.65	0.16	0.02
Natural Gas	0.23	0.23	Neg.	0.45	0.38	0.02
EmGen #1	0.02	0.02	0.01	0.86	0.19	0.07
EmGen #2	0.05	0.05	0.02	1.76	0.38	0.14
EmGen #3	0.01	0.01	0.01	0.50	0.06	0.02
EmGen #4	0.01	0.01	Neg.	0.43	0.05	0.02
Total TPY	6.39	6.39	23.51	15.25	6.58	0.71

III. AMBIENT AIR QUALITY ANALYSIS

According to the Maine Regulations Chapter 115, the level of air quality analyses required for a renewal source shall be determined on a case-by case basis. Based on the above total facility emissions, USM is below the emissions level required for modeling and monitoring.

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 A-462-71-L-A, subject to the conditions found in Air Emission License A-462-71-K-R/M, and the following conditions:

SPECIFIC CONDITIONS

The following shall replace conditions 16 and 17 in License A-462-71-K-R/M:

(16) **Boilers #1 - #3 and #5 - #7**

- A. Combined natural gas use shall not exceed 92,000,000 scf/year (12-month rolling total) in boilers #1, #2 and #3, and 9,000,000 scf/yr in boilers #5, #6, and #7. Compliance shall be based on fuel receipts from the supplier documenting quantity delivered to boilers #1, #2, and #3 and to boilers #5, #6, and #7. [06-096 CMR 115, BPT, BACT]
- B. Combined #2 fuel oil use shall not exceed 600,000 gal/year (12-month rolling total) in boilers #1, #2 and #3, and 65,000 gal/yr in boilers #5, #6, and #7. All #2 fuel oil shall meet the criteria in ASTM D396. Compliance shall be based on fuel receipts from the supplier documenting quantity and type of fuel delivered to boilers #1, #2, and #3 and to boilers #5, #6, and #7. Compliance records shall be kept on a 12 month rolling total. [06-096 CMR 115, BPT, BACT]

C. Emissions shall not exceed the following:

Emission Unit	Pollutant	lb/MMBtu nat. gas	lb/MMBtu #2 fuel oil	Origin and Authority
Boiler #1	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)
Boiler #2	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)
Boiler #3	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)
Boiler #5	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)
Boiler #6	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)
Boiler #7	PM	0.05	0.08	06-096 CMR 103(2)(B)(1)(a)

D. Emissions shall not exceed the following [06-096 CMR 115, BPT, 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 #1, #2 (each) #2 fuel oil	1.67	1.67	10.52	2.99	0.75	0.08
Nat. gas	1.05	1.05	0.01	2.05	1.72	0.11
Boiler #3 #2 fuel oil	0.50	0.50	3.17	0.90	0.23	0.03
Nat. gas	0.32	0.32	0.01	0.62	0.52	0.03
Boiler #5, #6 (each) #2 fuel oil	0.30	0.30	1.89	0.54	0.13	0.01
Nat. gas	0.19	0.19	Neg.	0.36	0.31	0.02
Boiler #7 #2 fuel oil	0.25	0.25	1.57	0.45	0.11	0.01
Nat. gas	0.16	0.16	Neg.	0.30	0.25	0.02

E. Visible Emissions [06-096 CMR 101, BPT, BACT]

1. When firing #2 fuel oil, visible emissions from each boiler stack shall not exceed 20% opacity on a six (6) minute block average.
2. When firing natural gas, visible emissions from each boiler stack shall not exceed 10% opacity on a six (6) minute block average.

(17) **Emergency Generators #1 through #4**

- A. USM shall limit the operation of each Emergency Generator to 500 hr/yr (based on a 12 month rolling total). An hour meter shall be maintained and operated on the Emergency Generators. [06-096 CMR 115, BPT, BACT]
- B. The Emergency Generators shall only to be operated for maintenance purposes and for situations arising from sudden and reasonably unforeseeable events beyond the control of the source. The Back-up Generator shall not to 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, BACT]
- C. Emergency Generators #1 and #2 shall fire only Diesel Fuel with a sulfur limit not to exceed 0.05% by weight. Compliance shall be based on fuel receipts from the supplier showing the quantity of fuel delivered and the percent sulfur of the fuel. [06-096 CMR 115, BPT]
- D. Emergency Generators #3 and #4 shall fire only natural gas. [06-096 CMR 115, BPT, BACT]
- E. Emissions shall not exceed the following [06-096 CMR 115, BPT, BACT]

Emission Unit	PM (lb/hr)	PM₁₀ (lb/hr)	SO₂ (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Generator #1	0.09	0.09	0.04	3.44	0.74	0.27
Generator #2	0.19	0.19	0.08	7.06	1.52	0.56
Generator #3	0.03	0.03	0.01	1.97	0.24	0.02
Generator #4	0.03	0.03	Neg.	1.73	0.21	0.07

- F. Visible emissions from Emergency Generators #1 and #2 shall not exceed 20% opacity on a six (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, BPT]

G. Visible emissions from Emergency Generators #3 and #4 shall not exceed 10% opacity on a six (6) minute block average, except for no more than one (1), six (6) minute block average in a 3-hour period. [06-096 CMR 101, BPT, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS 25th DAY OF FEBRUARY, 2008.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
DAVID P. LITTELL, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-462-71-K-R/M.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 6/13/2007

Date of application acceptance: 6/18/2007

Date filed with the Board of Environmental Protection: February 26, 2008

This Order prepared by Jonathan Voisine, Bureau of Air Quality.