



DEPARTMENT ORDER

University of Maine System
Penobscot County
Orono, Maine
A-204-77-14-A

Departmental
Findings of Fact and Order
New Source Review
NSR #14

FINDINGS OF FACT

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

I. REGISTRATION

A. Introduction

FACILITY	University of Maine System
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	611310
NATURE OF BUSINESS	Educational Facility
FACILITY LOCATION	5765 Service Building and throughout the Orono Campus

B. NSR License Description

The University of Maine (UMaine, the University) has requested a New Source Review (NSR) license for the installation of a new 400-kilowatt natural gas-fired emergency electric generator which is part of the new Engineering Education and Design Center (EEDC) project on the Orono campus.

C. Emission Equipment

The following new equipment is addressed in this NSR license:

Generators/Engines

Equipment	Max. Heat Input Capacity (MMBtu/hr)	Max. Firing Rate (scfh)	Output (kW)	Fuel Type, % sulfur	Mfr. Date	Install. Date
EEDC Generator	4.9	4823	400	natural gas, negligible	2021	2021

D. Application Classification

The application for UMaine does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing, or record keeping.

The modification of a major source is considered a major modification based on whether expected emissions increases exceed the “Significant Emission Increase Levels” as given in *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100.

The emissions increases due to the proposed EEDC emergency generator were calculated based on an operational limit of 100 hours per year of non-emergency operation. The results of the calculations are as follows:

<u>Pollutant</u>	<u>Future Generator License Allowed (ton/year)</u>	<u>Significant Emissions Increase Levels (ton/year)</u>
PM	0.01	25
PM ₁₀	0.01	15
PM _{2.5}	0.01	10
SO ₂	0.0002	40
NO _x	0.01	40
CO	0.06	100
VOC	0.01	40
CO ₂ e	< 75,000	75,000

Note: The above numbers are for the EEDC Generator only. None of the other equipment at the facility is affected by this NSR license.

Because the emissions increases do not exceed the specified emission increase levels, the NSR license is determined to be a minor modification under *Minor and Major Source Air Emission License Regulations* 06-096 C.M.R. ch. 115 (as amended) since the changes being made are not addressed or prohibited in the Part 70 air emission license. An application to incorporate the requirements of this NSR license into the Part 70 air emission license has been submitted.

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

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in

Definitions Regulation, 06-096 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

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

B. EEDC Generator

The University is planning to install a new 400-kilowatt natural gas-fired emergency generator next to Boardman Hall as part of the Ferland Engineering Education and Design Center (EEDC) Project. The EEDC will house the Biomedical Engineering Program and the Department of Mechanical Engineering, as well as teaching laboratories for the Mechanical Engineering Technology Program. It also will provide space for all UMaine engineering majors to complete their senior capstone projects and contain collaborative learning classrooms that will serve the entire campus. The emergency generator, manufactured in 2021, was manufactured by Caterpillar and is rated at a heat input capacity of 4.9 MMbtu/hr firing natural gas (4,823 scfh). The emergency generator is classified as a spark-ignition, 4-stroke, rich-burn, turbocharged, reciprocating internal combustion engine.

1. BACT Findings

a. Particulate Matter (PM, PM₁₀)

PM emissions from emergency generators of this size are generally controlled through engine design and proper operation. UMaine proposed to meet BACT for PM by using an engine design that complies with *Standards of Performance for Spark Ignition Internal Combustion Engines*, 40 C.F.R. Part 60, Subpart JJJJ (Subpart JJJJ) and through proper operation of the generator.

b. Sulfur Dioxide (SO₂)

UMaine has proposed to fire only natural gas, a fuel with a low sulfur content. The use of this fuel results in minimal emissions of SO₂; thus, additional add-on pollution controls are not economically feasible. In addition, the engine shall meet the requirements of Subpart JJJJ and be limited in the number of hours the unit can operate in non-emergency situations.

c. Nitrogen Oxide (NO_x), Carbon Monoxide (CO), and Volatile Organic Compounds (VOC)

Emissions of NO_x, CO, and VOC from the type of engine proposed are typically controlled using Nonselective Catalytic Reduction (NSCR) technology. With NSCR technology, the pollutants pass through a catalyst which reduces NO_x to

nitrogen and oxidizes the CO and VOC to carbon dioxide and water vapor. UMaine proposes to meet BACT for NO_x, CO, and VOC by using an engine equipped with this type of “three-way” catalyst to meet the applicable emissions standards contained in Subpart JJJJ.

2. Emission Limits

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

- PM/PM₁₀ - 0.05 lb/MMBtu from 06-096 C.M.R. ch. 115, BACT
- SO₂ - 0.000588 lb/MMBtu from AP-42 Table 3.2-3 (dated 7/2000)
- NO_x - 0.14 g/bhp-hr based on manufacturer data
- CO - 0.82 g/bhp-hr based on manufacturer data
- VOC - 0.18 g/bhp-hr based on manufacturer data
- Visible Emissions - 06-096 C.M.R. ch. 115, BACT

The BACT emission limits for the EEDC Generator are the following:

Unit	Pollutant	lb/MMBtu
EEDC Generator	PM	0.05

Unit	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
EEDC Generator	0.25	0.25	0.003	0.20	1.15	0.25

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

3. 40 C.F.R. Part 60, Subpart JJJJ

Standards of Performance for Spark Ignition Internal Combustion Engines, 40 C.F.R. Part 60, Subpart JJJJ is applicable to the emergency engine listed above since the unit was ordered after June 12, 2006, and manufactured after January 1, 2009. [40 C.F.R. § 60.4230]

By meeting the requirements of 40 C.F.R. Part 60, Subpart JJJJ, the unit also meets the requirements found in the *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, 40 C.F.R. Part 63, Subpart ZZZZ. [40 C.F.R. § 63.6590(c)]

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

a. Emergency Engine Designation and Operating Criteria

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

(1) Emergency Situation Operation (On-Site)

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

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

(2) Non-Emergency Situation Operation

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

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

local standards require maintenance and testing of emergency ICE more than 100 hours per calendar year.

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

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

[40 C.F.R. §§ 60.4243(d) and 60.4248]

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

(1) Manufacturer Certification Requirement

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

(2) Non-Resettable Hour Meter Requirement

A non-resettable hour meter shall be installed and operated on the engine. [40 C.F.R. § 60.4237]

(3) Operation and Maintenance Requirement

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

(4) Annual Time Limit for Maintenance and Testing

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

(5) Recordkeeping

UMaine shall keep records that include maintenance conducted on the engine and the hours of operation of the engine recorded through the non-resettable

hour meter. Documentation shall include the number of hours the unit operated for emergency purposes, the number of hours the unit operated for non-emergency purposes, and the reason the engine was in operation during each time. [40 C.F.R. § 60.4245(b)]

C. Incorporation Into the Part 70 Air Emission License

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

D. Annual Emissions

The following table provides an estimate of facility-wide annual emissions for the purposes of calculating the facility’s annual air license fee. Only licensed equipment is included, i.e., emissions from insignificant activities are excluded. Similarly, unquantifiable fugitive particulate matter emissions are not included.

UMaine is licensed for the following annual emissions, based on a 12-month rolling total. The tons per year limits were calculated based on the established limits and the following:

- 8,760 hours/year of operation for each of the Global Science Boilers and Small Boilers;
- 100 hours/year of operation for each emergency generator;
- 500 hours/year for each non-emergency generator;
- an annual No. 6 fuel oil use limit of 3,500,000 gallons per year based on a 12-month rolling total; and
- the established BPT for the Printing Services Department.

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
Steam Plant Boilers (#5, #6, #7, and #8)	26.3	26.3	136.5	144.4	157.5	26.3
Global Science Boiler #1	1.0	1.0	0.01	1.9	1.6	0.1
Global Science Boiler #2	1.0	1.0	0.01	1.9	1.6	0.1
Small Boilers (< 3.2 MBtu/hr)	0.8	0.8	0.1	10.4	8.7	0.6
Portable Generator #2 (Model 3406C)	0.02	0.02	0.01	0.4	0.1	0.01
Hitchner Hall Generator	0.02	0.02	0.01	0.5	0.2	0.01
Aubert Hall Generator	0.02	0.02	0.01	0.5	0.1	0.01

	PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Barrows Hall Generator	0.02	0.02	0.01	0.5	0.1	0.01
Alfond Arena Generator	0.01	0.01	0.01	0.1	0.03	0.01
Neville Hall Data Center Generator	0.01	0.01	0.01	0.9	0.1	0.01
Memorial Gym Generator	0.01	0.01	0.01	0.01	0.02	0.02
Wells Commons Generator	0.01	0.01	0.01	0.41	0.1	0.01
York Hall Generator	0.01	0.01	0.01	0.06	0.94	0.01
Estabrooke Hall Generator	0.01	0.01	0.01	0.01	0.71	0.01
Small Generators (<3 MMBtu/hr) firing Natural Gas/Propane	0.01	0.01	0.01	0.81	1.24	0.01
Small Generators (<3 MMBtu/hr) firing Distillate Fuel	0.04	0.04	0.01	1.3	0.28	0.10
Recreation Center Generator	0.1	0.1	0.01	1.5	0.2	0.03
Hilltop Commons Generator	0.2	0.2	0.01	2.9	0.2	0.03
Collins Center Generator	0.1	0.1	0.01	1.3	0.4	0.02
Steam Plant Generator	0.001	0.001	0.0001	0.115	0.008	0.001
EEDC Generator	0.01	0.01	--	0.01	0.06	0.01
Printing Services	-	-	-	-	-	2.0
Total TPY	29.7	29.7	136.8	169.9	174.2	29.4

Pollutant	Tons/year
Single HAP	9.9
Total HAP	24.9

Please note, this information provides the basis for fee calculation only and should not be construed to represent a comprehensive list of license restrictions or permissions. That information is provided in the Order section of this license.

III. AMBIENT AIR QUALITY ANALYSIS

UMaine previously submitted an ambient air quality impact analysis outlined in air emission license A-204-77-3-A (dated June 9, 2011) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards (AAQS). An additional ambient air quality impact analysis is not required for this NSR license.

ORDER

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

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

The Department hereby grants New Source Review License A-204-77-14-A pursuant to the preconstruction licensing requirements of 06-096 C.M.R. ch. 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision of this License or part thereof 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

(1) EEDC Generator

- A. The EEDC Generator shall be limited to 100 hours of operation per calendar year, excluding operating hours during emergency situations.
[06-096 C.M.R. ch. 115, BACT]
- B. Emissions shall not exceed the following [06-096 C.M.R. ch. 115, BACT]:

Unit	PM (lb/MMBtu)	PM (lb/hr)	PM ₁₀ (lb/hr)	SO ₂ (lb/hr)	NO _x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
EEDC Generator	0.05	0.25	0.25	0.003	0.20	1.15	0.25

C. Visible Emissions

Visible emissions from the EEDC Emergency Generator shall not exceed 10% opacity on a six (6) minute block average basis. [06-096 C.M.R. 115, BACT]

- D. The EEDC Generator shall meet the applicable requirements of 40 C.F.R. Part 60, Subpart JJJJ, including the following:
[incorporated under 06-096 C.M.R. ch. 115, BACT]
1. **Manufacturer Certification**
The engine shall be certified by the manufacturer as meeting the emission standards for new nonroad spark ignition engines found in 40 C.F.R. Part 60, Subpart JJJJ, Table 1.
 2. **Non-Resettable Hour Meter**
A non-resettable hour meter shall be installed and operated on the engine.
[40 C.F.R. § 60.4237 and 06-096 C.M.R. ch. 115, BACT]
 3. **Annual Time Limit for Maintenance and Testing**
 - a. As an emergency engine, the unit shall be limited to 100 hours/year for maintenance checks and readiness testing. Up to 50 hours/year of the 100 hours/year may be used in non-emergency situations (this does not include peak shaving, demand response, or to generate income for a facility by providing power to an electric grid or otherwise supply power as part of a financial arrangement with another entity). The limits are based on a calendar year. Compliance shall be demonstrated by records (electronic or written log) of all engine operating hours.
[40 C.F.R. § 60.4243(d) and 06-096 C.M.R. ch. 115, BACT]
 - b. UMaine shall keep records that include maintenance conducted on the engine and the hours of operation of the engine recorded through the non-resettable hour meter. Documentation shall include the number of hours the unit operated for emergency purposes, the number of hours the unit operated for non-emergency purposes, and the reason the engine was in operation during each time. [40 C.F.R. § 60.4245(b)]

4. Operation and Maintenance

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

DONE AND DATED IN AUGUSTA, MAINE THIS 26th DAY OF APRIL, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:  for
MELANIE LOYZIM, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 22, 2020

Date of application acceptance: December 23, 2020

Date filed with the Board of Environmental Protection:

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

FILED
APR 26, 2021
State of Maine
Board of Environmental Protection