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

DEPARTMENT ORDER

Madison Electric Works **Somerset County** **Madison, Maine** **A-1100-71-C-A**	**Departmental** **Findings of Fact and Order** **Air Emission License** **Amendment #2**

FINDINGS OF FACT

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

I. REGISTRATION

A. Introduction

Madison Electric Works (Madison Electric) was issued Air Emission License A-1100-71-A-N on July 1, 2014, for the operation of emission sources associated with their utility services facility. The license was subsequently amended on April 29, 2019 (A-1100-71-B-A).

Madison Electric has requested an amendment to their license to replace Generator #1, which was destroyed in a fire at the facility, with a new natural gas-fired generator.

The equipment addressed in this license amendment is located on Jones Street at the Jones Street Substation in Madison, Maine.

B. Emission Equipment

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

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Fuel Type, % sulfur	Firing Rate	Date of Manuf.	Date of Install.
Stationary Engine Being Removed						
Generator #1	12.58	1,349	Distillate Fuel, 0.0015%	91.6 gal/hr	1986	1987
Stationary Engine Being Installed						
CAT Generator	22.8	2,500	Natural Gas, neg.	21,845 scf/hr	2021	2021

C. Application Classification

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

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

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Significant Emission Levels
PM	0.4	3.6	3.2	100
PM_{10}	0.4	3.6	3.2	100
SO_2	0.1	0.1	0.0	100
NO_x	10.0	24.9	14.9	100
CO	0.8	49.8	49.0	100
VOC	0.3	17.4	17.1	50

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

D. Facility Classification

The facility is licensed as follows:

- As a natural minor source of air emissions, because no license restrictions are necessary to keep facility emissions below major source thresholds for criteria pollutants; and
- As an area source of hazardous air pollutants (HAP), because the licensed emissions are below the major source thresholds for HAP.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment.

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

B. CAT Generator

Madison Electric is installing a new CAT Generator to replace their old Generator #1 that was destroyed in a fire in May of 2020. The new generator will be used to supply electricity to the grid in a non-emergency capacity during periods of high electrical demand. The CAT Generator will consist of a generator having a rated electrical output of 2,500 kilowatts (kW) and an engine capable of producing 3,629 brake horsepower (BHP) at the output shaft. The engine is designed to fire natural gas at a maximum rate of 21,845 standard cubic feet per hour (SCFH) and have a maximum heat input capacity of 22.8 MMBtu per hour. The engine is equipped with air-to-fuel ratio control (AFRC), a control system that optimizes combustion and minimizes NO_x emissions. The CAT Generator was manufactured and will be installed in 2021 and will exhaust through its own stack having a height of at least 37 feet above ground level (AGL). With the building peak height of 24.5 feet above ground level, a stack height of 37 feet AGL represents 60% of Good Engineering Practice stack height, as defined in *Prohibited Dispersion Techniques*, 06-096 C.M.R. ch. 116.

The CAT Generator's engine will be certified to meet applicable emissions standards found in Table 1 of *Standards of Performance for Spark Ignition Internal Combustion Engines,* 40 C.F.R. Part 60, Subpart JJJJ (Subpart JJJJ) for NO_x, CO, and VOC. Therefore, Madison Electric shall be required to maintain on-site a current copy of the manufacturer's emissions-related written instructions for the operation and maintenance of the CAT Generator engine.

Madison Electric has elected to take an operating hour limit of 6,225 hours per year for their CAT Generator to exempt them from the emissions inventory reporting requirements contained in *Emission Statements*, 06-096 C.M.R. ch. 137.

1. BACT Findings

a. Particulate Matter: PM / PM_{10}

Particulate matter emissions from natural gas-fired equipment are generally controlled through their proper operation and maintenance and by the use of good combustion practices. The Department finds that BACT for PM/PM_{10} emissions from the CAT Generator shall be the firing of natural gas, the use of good combustion practices, the proper operation and maintenance of the generator set, and the emission limits listed in the table below.

b. Sulfur Dioxide: SO_2

SO_2 emissions from generator sets are directly related to the sulfur content of the fuel being fired. Because natural gas is inherently low in sulfur content, the BACT determination for SO_2 for the CAT Generator is to fire natural gas exclusively, for it to be properly operated and maintained, and the emission limits listed in the table below.

c. Nitrogen Oxides, Carbon Monoxide, and Volatile Organic Compounds: NO_x, CO, and VOC

The CAT Generator will utilize a natural gas-fired engine certified to meet or exceed applicable standards for NO_x, CO, and VOC for non-emergency engines as required in Table 1 of Subpart JJJJ. The engine is equipped with an AFRC which optimizes combustion in the engine and minimizes NO_x emissions below the requirements of Subpart JJJJ. The Department finds that the use and proper operation of this certified engine and its associated AFRC constitutes BACT for this engine for those criteria air pollutants. The emission limits from Subpart JJJJ for NO_x, CO, and VOC are listed in the table below.

2. Emission Limits

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

PM/PM_{10}	- 0.05 lb/MMBtu ,06-096 C.M.R. ch. 115, BACT
SO_2	- 0.000588 lb/MMBtu, from AP-42 Table 3.2-2 (7/00)
NO_x	- 1.0 g/HP-hr; 82 ppmvd at 15% O_2 from 40 C.F.R. Part 60, Subpart JJJJ, Table 1 (7/28/11)
CO	- 2.0 g/HP-hr; 270 ppmvd at 15% O_2 from 40 C.F.R. Part 60, Subpart JJJJ, Table 1 (7/28/11)
VOC	- 0.7 g/HP-hr; 60 ppmvd at 15% O_2 from 40 C.F.R. Part 60, Subpart JJJJ, Table 1 (7/28/11)
Visible Emissions	- 06-096 C.M.R. ch. 115, BACT

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

Unit	Pollutant	lb/MMBtu
CAT 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)
CAT Generator	1.14	1.14	0.01	8.00	16.00	5.60

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

The Department has determined that the proposed BACT visible emission limit is more stringent than the applicable limit in 06-096 C.M.R. ch. 101. Therefore, the visible emission limit for the generator has been streamlined to the more stringent BACT limit, and only this more stringent limit shall be included in the air emission license.

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 (Subpart JJJJ) is applicable to the CAT Generator 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 federal Subpart JJJJ requirements is listed below.

a. Manufacturer Certification Requirement

(1) The CAT Generator to be installed by Madison Electric shall be certified by the manufacturer to comply with the applicable emission standards specified in Table 1 to Subpart JJJJ. [40 C.F.R. § 60.4233(e)]

(2) The CAT Generator shall be operated and maintained to meet the emission standards as required in § 60.4233(e) over the entire life of the engine. [40 C.F.R. § 60.4234]

b. Recordkeeping

(1) Madison Electric shall operate and maintain the CAT Generator engine according to the manufacturer's emission-related written instructions or procedures developed by Madison Electric that are approved by the engine manufacturer. Madison Electric may only change those settings that are permitted by the manufacturer. [40 C.F.R. § 60.4243]

(2) Madison Electric shall meet the following notification, reporting, and recordkeeping requirements:

(i) All notifications submitted by Madison Electric to comply with Subpart JJJJ, and all documentation supporting any notifications.

(ii) Records of all maintenance conducted on the CAT Generator; and

(iii) Documentation from the manufacturer that the CAT Generator is certified to meet the emission standards required in Subpart JJJJ.

[40 C.F.R. § 60.4245(a)]

c. Air-To-Fuel Ratio Controls

The air-to-fuel ratio controller utilized on the CAT Generator shall be maintained and operated appropriately in order to ensure proper operation of the engine to minimize emissions at all times. [40 C.F.R. § 60.4243(g)]

4. Non-Resettable Hour Meter Requirement

A non-resettable hour meter shall be installed and operated on the CAT Generator engine for compliance demonstration with the annual operating hour limit. [06-096 C.M.R. ch. 115, BACT]

C. Annual Emissions

The table below 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. Maximum potential emissions were calculated based on operating the CAT Generator at 100% load for 6,225 hours per year.

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.

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**
CAT Generator	3.6	3.6	0.1	24.9	49.8	17.4
Total TPY	3.6	3.6	0.1	24.9	49.8	17.4

Pollutant	**Tons/year**
Single HAP	9.9
Total HAP	24.9

III. AMBIENT AIR QUALITY ANALYSIS

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

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

The total licensed annual emissions for the facility are below the emission levels contained in the table above and there are no extenuating circumstances; therefore, an ambient air quality impact analysis is not required as part of this license amendment.

ORDER

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

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

The Department hereby grants Air Emission License Amendment A-1100-71-C-A-subject to the conditions found in Air Emission License A-1100-71-A-N, amendment A-1100-71-B-A, and the following conditions.

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

SPECIFIC CONDITIONS

The following shall replace Specific Condition (16) of Air Emission License A-1100-71-A-N (July 1, 2014) in its entirety:

(16) **CAT Generator**

A. Fuels

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

B. Manufacturer Certification Requirement

1. The CAT Generator to be installed by Madison Electric shall be certified by the manufacturer to comply with the applicable emission standards specified in Table 1 of Subpart JJJJ. [40 C.F.R. § 60.4233(e)]

2. The CAT Generator shall be operated and maintained to meet the emission standards as required in § 60.4233(e) over the entire life of the engine. [40 C.F.R. § 60.4234]

C. Emissions shall not exceed the following:

Unit	Pollutant	lb/MMBtu	Origin and Authority
CAT Generator	PM	0.05	06-096 C.M.R. ch. 115, BACT

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

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
CAT Generator	1.14	1.14	0.01	8.00	16.00	5.60

E. Visible Emissions

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

F. Operation and Maintenance

1. The CAT Generator shall have a vertical exhaust stack that discharges at least 37 feet above ground level. [06-096 C.M.R. ch. 115, BACT]

2. Operation of the CAT Generator shall not exceed 6,225 hours per calendar year. Madison Electric shall keep records to document compliance with this operational limitation. [06-096 C.M.R. ch. 115, BACT]

3. Madison Electric shall maintain on-site a current copy of the manufacturer's emission-related written instructions for the operation and maintenance of the CAT Generator engine and the air-to-fuel ratio controller.
[06-096 C.M.R. ch. 115, BACT]

4. Madison Electric shall operate and maintain the CAT Generator engine according to the manufacturer's emission-related written instructions or procedures developed by Madison Electric that are approved by the engine manufacturer. Madison Electric may only change those settings that are permitted by the manufacturer.
[40 C.F.R. § 60.4243(b)]

G. Air-To-Fuel Ratio Controls

The air-to-fuel ratio controller utilized on the CAT Generator shall be maintained and operated appropriately in order to ensure proper operation of the engine to minimize emissions at all times. [40 C.F.R. § 60.4243(g)]

H. Madison Electric shall keep records of the following information:

1. All notifications submitted to comply with Subpart JJJJ, along with all documentation supporting any notifications;
2. Records of all maintenance activities conducted on the CAT Generator; and
3. Documentation from the manufacturer that the CAT Generator is certified to meet the emission standards required in Subpart JJJJ.

Any of the above records or documents requested by the Department or the Environmental Protection Agency shall be made available by Madison Electric for immediate review upon request.

[40 C.F.R. § 60.4245(a)]

I. Non-Resettable Hour Meter

A non-resettable hour meter shall be installed and operated on the CAT Generator engine. [06-096 C.M.R. ch. 115, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS 14th DAY OF SEPTEMBER, 2021.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____ for _____
MELANIE LOYZIM, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-1100-71-A-N.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: May 14, 2021
Date of application acceptance: May 18, 2021

Date filed with the Board of Environmental Protection:
This Order prepared by Patric J. Sherman, Bureau of Air Quality.

FILED

SEPT 14, 2021

State of Maine
Board of Environmental Protection