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

DEPARTMENT ORDER

Kents Hill School **Kennebec County** **Readfield, Maine** **A-786-71-G-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

Kents Hill School (KHS) was issued Air Emission License A-786-71-E-N on December 23, 2015, for the operation of emission sources associated with their educational facility. The license was subsequently amended on April 1, 2016 (A-786-71-F-M).

KHS has requested an amendment to their license in order to add a propane-fired emergency generator, Generator #2. KHS is also adding Generator #3 at their facility, which is below the licensing threshold and is included in the table below for completeness purposes only.

The equipment addressed in this license amendment is located at 1614 Main Street, Readfield, Maine.

B. Emission Equipment

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

Stationary Engines

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Fuel Type, % sulfur	Firing Rate (gal/hr)	Date of Manuf.	Date of Install.
Generator #2	1.37	140	propane, neg.	14.97	2016	2021
Generator #3 *	0.38	39	propane, neg.	4.15	2012	2021

* Generator #3 is below 0.5 MMBtu/hr in size and is therefore considered an insignificant activity. It will not be addressed further in this license amendment.

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	1.2	1.2	0.0	100
PM_{10}	1.2	1.2	0.0	100
SO_2	7.2	7.2	0.0	100
NO_x	2.8	2.9	0.1	100
CO	0.7	0.8	0.1	100
VOC	0.2	0.3	0.1	50

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

D. Facility Classification

With the annual fuel limit on the boilers and the operating hours restriction on the emergency generators, the facility is licensed as follows:

- As a synthetic minor source of air emissions for NO_x, because KHS is subject to license restrictions that 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. Generator #2

KHS operates Generator #2 as an emergency generator which consists of an engine and an electrical generator. Located at the dining commons, Generator #2 has an engine rated at 1.37 MMBtu/hr and fires propane. Generator #2 was manufactured in 2016.

1. BACT Findings

The BACT emission limits for Generator #2 are based on the following:

a. Particulate Matter (PM and PM_{10})

PM emissions from propane-fired engines are generally controlled through proper operation and maintenance. Additionally, this engine will be subject to 40 C.F.R. Part 60, Subpart JJJJ, which means that it will be required to meet EPA emission standards for emergency stationary engines as discussed below. Given the operating hours restriction included in 40 C.F.R. Part 60, Subpart JJJJ for emergency engines, the use of add-on controls for PM is not economically feasible.

BACT for PM emissions from Generator #2 is the use of an engine certified under 40 C.F.R. Part 60, Subpart JJJJ.

b. Sulfur Dioxide (SO_2)

Generator #2 is limited by 40 C.F.R. Part 60, Subpart JJJJ to an operating hours limitation of 100 hours per year for non-emergency use. This unit will fire propane, which inherently has a low fuel sulfur content. Emergency engines of this size that fire propane and that are licensed to operate only for short periods of time have a limited potential for generating SO_2 emissions, making the use of wet scrubbers or other additional SO_2 add-on control methods economically unfeasible.

BACT for SO_2 emissions from Generator #2 is the use of a low sulfur fuel, such as propane.

c. Nitrogen Oxides (NO_X)

Potentially available control options for reducing emissions of NO_x from propane-fired generators include combustion controls, selective catalytic reduction (SCR), and selective non-catalytic reduction (SNCR). Combustion controls are typically implemented through design features such as electronic ignition controls, injection systems, combustion chamber geometry, and turbocharging systems. Most new engines are designed with these features as standard equipment. SCR and SNCR are both post-combustion NO_x reduction technologies. SCR uses

ammonia to react with NO_x in the gas stream in the presence of a catalyst to form nitrogen and water. SNCR uses a catalyst to convert CO, NO_x, and hydrocarbons into carbon dioxide, nitrogen, and water without the use of an additional reagent, and requires strict air-to-fuel control to maintain high reduction effectiveness without increasing hydrocarbon emissions. For a unit installed for use as an emergency engine, neither SCR nor SNCR would be economically feasible considering the minimal emissions due to the limited use of the engine.

BACT for NO_x emissions from Generator #2 is the use of an engine certified under 40 C.F.R. Part 60, Subpart JJJJ.

d. Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

CO and VOC emissions from engines are the result of incomplete combustion, caused by conditions such as insufficient residence time or limited oxygen availability. CO and VOC emissions from propane-fired emergency engines are generally controlled through proper operation and maintenance. Oxidation catalysts have been used on large engines to reduce CO and VOC emission levels in the exhaust, but like SCR and SNCR, use of an oxidation catalyst on an emergency engine with limited yearly use would not provide a significant environmental benefit and would not be economically feasible.

BACT for CO and VOC emissions from Generator #2 is the use of an engine certified under 40 C.F.R. Part 60, Subpart JJJJ.

2. The BACT emission limits for Generator #2 are based on the following:

PM/PM_{10}	- 0.05 lb/MMBtu from 06-096 C.M.R. ch. 115, BACT
SO_2	- combustion of propane with a maximum sulfur content of 0.54 grams/100ft^3
NO_x	- 2 grams/hp-hr from 40 C.F.R. Part 60, Subpart JJJJ
CO	- 4 grams/hp-hr from 40 C.F.R. Part 60, Subpart JJJJ
VOC	- 1 gram/hp-hr from 40 C.F.R. Part 60, Subpart JJJJ
Visible Emissions	- 06-096 C.M.R. ch. 115, BACT

The BACT emission limits for Generator #2 are the following:

Unit	PM (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Generator #2	0.07	0.07	neg.	0.75	1.49	0.37

3. Visible emissions from Generator #2 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 Generator #2 has been streamlined to the more stringent BACT limit, and only this more stringent limit shall be included in the air emission license.

4. 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 federal 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 KHS that are approved by the engine manufacturer. KHS 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
KHS 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. 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 the following assumptions:

- Firing 200,000 gal/yr distillate fuel in the boilers;
- Operating Generators #1 and #2 for 100 hrs/yr each.

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
Boilers #1 and #2	1.1	1.1	7.1	2.0	0.5	0.1
Generator #1	0.1	0.1	0.1	0.8	0.2	0.1
Generator #2	--	--	--	0.1	0.1	0.1
Total TPY	**1.2**	**1.2**	**7.2**	**2.9**	**0.8**	**0.3**

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-786-71-G-A subject to the conditions found in Air Emission License A-786-71-E-N, in amendment A-786-71-F-M, 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 is a new condition of Air Emission License A-786-71-E-N.

(19) **Generator #2**

A. 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)
Generator #2	0.07	0.07	--	0.75	1.49	0.37

B. Visible Emissions

Visible emissions from Generator #2 shall not exceed 10% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

C. Generator #2 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, BPT]

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, BPT]

b. KHS 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 KHS that are approved by the engine manufacturer. KHS may only change those settings that are permitted by the manufacturer. [40 C.F.R. § 60.4243]

DONE AND DATED IN AUGUSTA, MAINE THIS 6th DAY OF OCTOBER, 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-786-71-E-N.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 4/22/21
Date of application acceptance: 4/26/21

Date filed with the Board of Environmental Protection:

This Order prepared by Chris Ham, Bureau of Air Quality.

FILED

OCT 06, 2021

State of Maine
Board of Environmental Protection