



DEPARTMENT ORDER

**The Jackson Laboratory
Hancock County
Bar Harbor, Maine
A-93-71-AC-M**

**Departmental
Findings of Fact and Order
Air Emission License
Amendment #5**

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

The Jackson Laboratory (JAX) was issued Air Emission License A-93-71-X-R on November 24, 2014, for the operation of emission sources associated with their biomedical facility. The license was subsequently amended on March 20, 2015 (A-93-71-Y-A), October 2, 2015 (A-93-71-Z-A), March 9, 2016 (A-93-71-AA-A), and November 7, 2016 (A-93-71-AB-A).

JAX has requested a minor revision to their license in order to make the following changes:

1. Install a new ethylene oxide sterilizer; and
2. Revise the visible emission standards for the generators.

The equipment addressed in this license amendment is located at 600 Main Street, Bar Harbor, Maine.

B. Emission Equipment

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

Process Equipment

Equipment	Process Rate	Pollution Control Equipment
EtO Sterilizer #3	170 g EtO/batch	Catalytic Oxidizer (Abator)

Generators

Equipment	Max. Input Capacity (MMBtu/hr)	Rated Output Capacity (kW)	Maximum Firing Rate (gal/hr)	Fuel Type, % Sulfur	Date of Manuf.
Generator #2	2.3	230	17.0	Distillate Fuel, 0.0015%	pre-2006
Generator #3	2.5	250	18.0	Distillate Fuel, 0.0015%	pre-2006
Generator #6	12.3	1250	89.7	Distillate Fuel, 0.0015%	1992
Generator #8	15.2	1500	111.2	Distillate Fuel, 0.0015%	2003
Generator #9	15.2	1500	111.2	Distillate Fuel, 0.0015%	2003
Generator #10	19.0	2000	138.0	Distillate Fuel, 0.0015%	2016

JAX may operate small stationary engines smaller than 0.5 MMBtu/hr. These engines are considered insignificant activities and are not required to be included in this license. However, they are still subject to applicable State and Federal regulations. More information regarding requirements for small stationary engines is available on the Department's website at the link below.

<http://www.maine.gov/dep/air/publications/docs/SmallRICEGuidance.pdf>

Additionally, JAX may operate portable engines used for maintenance or emergency-only purposes. These engines are considered insignificant activities and are not required to be included in this license. However, they may still be subject to applicable State and Federal regulations.

C. Definitions

Distillate Fuel. For the purposes of this license, *distillate fuel* means the following:

- Fuel oil that complies with the specifications for fuel oil numbers 1 or 2, as defined by the American Society for Testing and Materials (ASTM) in ASTM D396;
- Diesel fuel oil numbers 1 or 2, as defined in ASTM D975;
- Kerosene, as defined in ASTM D3699;
- Biodiesel, as defined in ASTM D6751; or
- Biodiesel blends, as defined in ASTM D7467.

Engine Startup means the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For engines with catalytic controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

Portable Engine. For the purposes of this license, *portable engine* means an internal combustion engine which is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform. This definition does NOT include engines which remain or will remain at a location (excluding storage locations) for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period.

D. Application Classification

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.

This amendment will increase emissions by less than 4 ton/year for each single pollutant, not including greenhouse gases (GHG), and less than 8 ton/year for all pollutants combined, not including GHG. Therefore, this modification is determined to be a minor revision and has been processed as such.

E. Facility Classification

With the annual heat input limit on the boilers and vaporizers and the limits on the annual hours of operation for the generators the facility is licensed as follows:

- As a synthetic minor source of air emissions, because the licensed emissions are below the 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.

Emissions of nitrogen oxides (NO_x) are licensed above 80% of the major source threshold. Therefore, this facility is classified as an “80% Synthetic Minor” for the purpose of determining the minimum required compliance inspection frequency in accordance with Maine’s Compliance Monitoring Strategy.

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.

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. EtO Sterilizer #3

JAX has proposed the installation of a 3M™ Steri-VAC GS8X ethylene oxide (EtO) sterilizer with a chamber capacity of 7.9 cubic feet (EtO Sterilizer #3).

EtO Sterilizer #3 will use sealed EtO cartridges that are only punctured once the cartridge is inside the locked, sealed sterilization chamber, minimizing the potential for EtO leaks. The EtO cartridges are single-use and contain 170 grams of EtO each.

1. BACT Findings

EtO Sterilizer #3 will emit EtO which is both a VOC and a HAP.

EtO emissions can be controlled using add-on pollution control equipment such as wet scrubbers, catalytic oxidizers, or condensers, all three of which can achieve control efficiencies greater than 99%. Wet scrubbers produce a wastewater effluent that requires disposal and/or treatment. Condensers also produce a by-product ethylene oxide stream which would require disposal and treatment.

JAX proposes to install a catalytic oxidizer known as an abator. The 3M™ EtO Abator Model 50AN converts the EtO exhausted from the sterilization unit into carbon dioxide and water vapor. The exothermic reaction occurs in the presence of a proprietary catalyst and has an EtO destruction efficiency of 99.9%. Operating continuously with the catalytic oxidizer, EtO Sterilizer #3 has the potential to emit less than 10 pounds per year of EtO which is half of the insignificant emissions threshold for EtO as identified in 06-096 C.M.R. ch. 115, Appendix B(C).

Visible emissions from EtO Sterilizer #3 shall not exceed 10% opacity on a six (6) minute block average basis.

BACT for EtO Sterilizer #3 shall be operation and maintenance of the unit and its catalytic oxidizer according to the manufacturer's specifications.

JAX shall keep records for EtO Sterilizer #3 and the associated catalytic oxidizer of all maintenance performed including dates and details of what work was performed. JAX shall also keep records of the number of batches processed between catalytic oxidizer replacements.

2. National Emission Standards for Hazardous Air Pollutants

JAX is not subject to *National Emission Standards for Hospital Ethylene Oxide Sterilizers*, 40 C.F.R. Part 63, Subpart WWWW as JAX does not provide medical care and treatment for patients under supervision of licensed physicians or under nursing care. Therefore, JAX does not meet the definition of a hospital and is not subject to this subpart.

JAX is not subject to *Ethylene Oxide Emissions Standards for Sterilization Facilities*, 40 C.F.R. Part 63, Subpart O as JAX does not have the potential to use more than 1.0 ton/year of EtO. In addition, JAX is further exempt from this regulation as it is a research or laboratory facility as defined in the *Clean Air Act Amendments of 1990*, § 112(C)(7).

C. Generators

JAX operates six stationary generators (Generators #2, #3, #6, #8, #9, and #10). Each generator is a generator set consisting of an engine and an electrical generator. Generators #2, #3, #6, #8, #9, and #10 are each subject to a visible emission limit of 20% opacity 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 per *Visible Emissions Regulation*, 06-096 C.M.R. ch. 101.

JAX has proposed BPT for each generator to be a more stringent visible emission limit of 20% opacity on a six (6) minute block average basis, except for periods of startup and shutdown during which time JAX shall comply with the following work practice standards:

1. JAX shall maintain a log (written or electronic) of the date, time, and duration of all generator startups.
2. The generator shall be operated in accordance with the manufacturer's emission-related operating instructions.

3. JAX shall minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations shall apply.
4. The generator, including any associated air pollution control equipment, shall be operated at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

Startup is defined as the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For engines with catalytic controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

Operation of an engine for exercising or maintenance purposes where no load is applied and which lasts 30 minutes or less (each occurrence) is considered to be included in the definition of startup.

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

D. Annual Emissions

1. Total Annual Emissions

JAX shall be restricted to the following annual emissions, based on a 12-month rolling total. The tons per year limits were calculated based on the following:

- A combined annual fuel heat input for the boilers and vaporizers of 315,000 MMBtu/year for all fuels combined and selecting the fuel with the worst-case emissions for each pollutant.
- Operating Generators #6, #8, and #9 for 300 hr/year.
- Operating all other engines for 100 hr/year (i.e., non-emergency operation).
- Operating each ethylene oxide sterilizer and incinerator for 8760 hr/year.

Total Licensed Annual Emissions for the Facility

Tons/year

(used to calculate the annual license fee)

	PM	PM₁₀	SO₂	NO_x	CO	VOC
Boilers & Vaporizers	12.6	12.6	7.9	47.3	47.3	2.7
Generator #2	–	–	–	0.5	0.1	–
Generator #3	–	–	–	0.5	0.1	–
Generator #6	0.2	0.2	–	5.9	0.5	0.2
Generator #8	0.3	0.3	–	7.3	0.6	0.4
Generator #9	0.3	0.3	–	7.3	0.6	0.4
Generator #10	0.1	0.1	–	3.0	0.8	0.1
Portable Generator	–	–	–	0.5	0.1	–
Incinerator #1	3.0	3.0	4.2	9.3	0.8	0.4
Incinerator #3	3.8	3.8	1.4	1.6	5.5	1.6
Sterilizers	–	–	–	–	–	0.1
Total TPY	20.3	20.3	13.5	83.2	56.4	5.9

Pollutant	Tons/year
Single HAP	9.9
Total HAP	24.9

2. Greenhouse Gases

Greenhouse gases are considered regulated pollutants as of January 2, 2011, through ‘Tailoring’ revisions made to EPA’s *Approval and Promulgation of Implementation Plans*, 40 C.F.R. Part 52, Subpart A, § 52.21, *Prevention of Significant Deterioration of Air Quality* rule. Greenhouse gases, as defined in 06-096 C.M.R. ch. 100, are the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents (CO₂e).

The quantity of CO₂e emissions from this facility is less than 100,000 tons per year, based on the following:

- the facility’s fuel use limits;
- worst case emission factors from the following sources: U.S. EPA’s AP-42, the Intergovernmental Panel on Climate Change (IPCC), and *Mandatory Greenhouse Gas Reporting*, 40 C.F.R. Part 98; and
- global warming potentials contained in 40 C.F.R. Part 98.

No additional licensing actions to address GHG emissions are required at this time.

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-93-71-AC-M subject to the conditions found in Air Emission License A-93-71-X-R, in amendments A-93-71-Y-A, A-93-71-Z-A, A-93-71-AA-A, and A-93-71-AB-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 Condition (20)(D) of Air Emission License A-93-71-AB-A:

(33) Emergency Generators #2 and #3

- D. Visible emissions from Generators #2 and #3 shall each not exceed 20% opacity on a six-minute block average basis, except for periods of startup and shutdown during which time JAX shall comply with the following work practice standards:
1. JAX shall maintain a log (written or electronic) of the date, time, and duration of all generator startups.
 2. The generator shall be operated in accordance with the manufacturer's emission-related operating instructions.
 3. JAX shall minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations shall apply.

4. The generator, including any associated air pollution control equipment, shall be operated at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

[06-096 C.M.R. ch. 115, BPT]

The following shall replace Condition (32)(E) of Air Emission License A-93-71-AB-A:

(32) Generators #6, #8, and #9

- E. Visible emissions from Generators #6, #8 and #9 shall each not exceed 20% opacity on a six-minute block average basis, except for periods of startup and shutdown during which time JAX shall comply with the following work practice standards:
 1. JAX shall maintain a log (written or electronic) of the date, time, and duration of all generator startups.
 2. The generator shall be operated in accordance with the manufacturer's emission-related operating instructions.
 3. JAX shall minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations shall apply.
 4. The generator, including any associated air pollution control equipment, shall be operated at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

[06-096 C.M.R. ch. 115, BPT]

The following shall replace Condition (28)(D) of Air Emission License A-93-71-AA-A:

(28) **Generator #10**

- D. Visible emissions from Generator #10 shall not exceed 20% opacity on a six-minute block average basis, except for periods of startup and shutdown during which time JAX shall comply with the following work practice standards:
1. JAX shall maintain a log (written or electronic) of the date, time, and duration of all generator startups.
 2. The generator shall be operated in accordance with the manufacturer's emission-related operating instructions.
 3. JAX shall minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations shall apply.
 4. The generator, including any associated air pollution control equipment, shall be operated at all times in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Department that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the unit.

[06-096 C.M.R. ch. 115, BPT]

The following shall replace Condition (27) of Air Emission License A-93-71-Y-A:

(27) **EtO Sterilizers #1, #2, and #3**

- A. EtO Sterilizers #1, #2, and #3 and the associated catalytic oxidizers shall be operated and maintained according to the manufacturer's specifications.
[06-096 C.M.R. ch. 115, BACT]
- B. The associated catalytic oxidizer shall be operated at all times EtO Sterilizers #1, #2, and #3 are in operation. [06-096 C.M.R. ch. 115, BACT]
- C. JAX shall keep records for EtO Sterilizers #1, #2, and #3 and the associated catalytic oxidizers of all maintenance performed including dates and details of what work was performed. JAX shall also keep records of the number of batches processed in each machine between catalytic oxidizer replacements. [06-096 C.M.R. ch. 115, BACT]

- D. JAX shall calculate VOC and HAP emissions on a calendar year basis based on the number of batches processed in each machine, ethylene oxide usage, and an oxidizer conversion efficiency of 99%. [06-096 C.M.R. ch. 115, BACT]
- E. Visible emissions from EtO Sterilizers #1, #2, and #3 shall each not exceed 10% opacity on a six (6) minute block average basis. [06-096 C.M.R. ch. 115, BACT]

DONE AND DATED IN AUGUSTA, MAINE THIS 12 DAY OF October, 2018.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Core for
PAUL MERCER, COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-93-71-X-R.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 9/5/18

Date of application acceptance: 9/10/18

Date filed with the Board of Environmental Protection:

This Order prepared by Lynn Muzzey, Bureau of Air Quality.

