



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE  
GOVERNOR

PATRICIA W. AHO  
COMMISSIONER

**The Jackson Laboratory  
Hancock County  
Bar Harbor, Maine  
A-93-71-Y-A (SM)**

**Departmental  
Findings of Fact and Order  
Air Emission License  
Amendment #1**

**FINDINGS OF FACT**

After review of the air emissions 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 Annotated (M.R.S.A.), §344 and §590, the Maine Department of Environmental Protection (Department) finds the following facts:

**I. REGISTRATION**

**A. Introduction**

1. The Jackson Laboratory (Jackson) was issued Air Emission License A-93-71-X-R on November 24, 2014, permitting the operation of emission sources associated with their biomedical facility.
2. Jackson has requested an amendment to their license in order to replace the existing ethylene oxide (EtO) sterilization units with two new sterilization units equipped with EtO abators (catalytic oxidizers) with control efficiencies of 99.9%
3. The equipment addressed in this license is located at 600 Main Street, Bar Harbor, Maine.

AUGUSTA  
17 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0017  
(207) 287-7688 FAX: (207) 287-7826  
RAY BLDG., HOSPITAL ST.

BANGOR  
106 HOGAN ROAD, SUITE 6  
BANGOR, MAINE 04401  
(207) 941-4570 FAX: (207) 941-4584

PORTLAND  
312 CANCO ROAD  
PORTLAND, MAINE 04103  
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE  
1235 CENTRAL DRIVE, SKYWAY PARK  
PRESQUE ISLE, MAINE 04769  
(207) 764-0477 FAX: (207) 760-3143

B. Emission Equipment

The following equipment is addressed in this air emission license:

**Process Equipment**

<u>Equipment</u>	<u>Pollution Control Equipment</u>
Ethylene Oxide Sterilization Units (2)	Ethylene Oxide Abators (2)

C. Application Classification

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 CMR 100 (as amended). The emission increases are determined by subtracting the current licensed annual emissions preceding the modification from the maximum future licensed annual emissions, as follows:

<u>Pollutant</u>	<u>Current License (TPY)</u>	<u>Future License (TPY)</u>	<u>Net Change (TPY)</u>	<u>Significant Emission Levels</u>
PM	19.0	19.0	0.0	100
PM <sub>10</sub>	19.0	19.0	0.0	100
SO <sub>2</sub>	21.1	21.1	0.0	100
NO <sub>x</sub>	71.4	71.4	0.0	100
CO	50.3	50.3	0.0	100
VOC	5.4	4.5	-0.9	50
CO <sub>2</sub> e	<100,000	<100,000	<100,000	100,000

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 (as amended). 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 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

### B. Ethylene Oxide Sterilizers

Jackson proposes to install two, 3M Steri-VC 8XL, dual cycle, gas sterilization units, each with a chamber capacity of 7.9 cubic feet, and each with a catalytic oxidizer to control EtO emissions. The sterilizers will use one Steri-gas cartridge, which contains 0.37 pounds of ethylene oxide, per batch. The oxidizers will convert ethylene oxide to carbon dioxide and water, with a control efficiency of greater than 99%. The sterilizer oxidizers will vent to stack S1, 10 feet above the building roof.

Jackson shall calculate VOC and HAP emissions based on the number of batches, total ethylene oxide usage and an oxidizer conversation efficiency of 99%.

Jackson is not subject to 40 CFR Part 63 Subpart WWWW – *National Emission Standards for Hospital Ethylene Oxide Sterilizers*, as Jackson does not provide medical care and treatment for patients under supervision of licensed physicians or under nursing care, therefore it does not meet the definition of a hospital.

Jackson is not subject to 40 CFR Part 63 Subpart O – *Ethylene Oxide Emissions Standards for Sterilization Facilities* as Jackson is a research or laboratory facility as defined section 112(C)(7) of the Clean Air Act Amendment of 1990. Jackson has the potential to use only 0.94 tons per year of ethylene oxide per year, therefore does not meet the 1.0 ton use threshold for applicability of this section.

Best Available Control Technology (BACT) Analysis:

The proposed sterilization units emit ethylene oxide (EtO) which is both a volatile organic compound (VOC) and a hazardous air pollutant (HAP).

EtO emissions can be feasibly controlled using add-on pollution control equipment such as wet scrubbers, analytic 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.

Jackson therefore proposes to install two catalytic oxidizers for control of EtO emissions from the two sterilizers. The catalytic oxidizers will control emission by 99%+, resulting in an EtO emission rate of 0.004 pounds per batch. Operating continuously with the catalytic oxidizers, the two sterilization units have the potential to emit 19 pounds per year of EtO.

The Department has determined BACT for the ethylene oxide sterilization units shall be operation and maintenance of the units according to the manufacturer's specifications, and operation of the catalytic oxidizers when one or both of the units are in operation.

Visible emissions from each of the catalytic oxidizers 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 three (3)-hour period.

Record Keeping Requirement:

Jackson shall maintain records documenting the number of batches processed for each unit, and ethylene oxide usage, both on a monthly and 12-month rolling total basis.

C. Annual Emissions

1. Total Annual Emissions

Jackson shall be restricted to the following annual emissions, based on a 12-month rolling total. The tons per year limits were calculated based on a combined annual fuel heat input limit of 315,000 MMBtu for the boilers and vaporizers, and the incinerators, 100 hours per year of operation for each generator, and operation of each the ethylene oxide sterilizers and catalytic oxidizers for 8760 hours per year.

**Total Licensed Annual Emissions for the Facility**  
**Tons per year**  
(used to calculate the annual license fee)

	<b>PM</b>	<b>PM<sub>10</sub></b>	<b>SO<sub>2</sub></b>	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>HAP</b>
Previously Licensed Equipment	19.0	19.0	21.1	71.4	50.3	4.4	-
<b>Ethylene Oxide Sterilizers</b>	-	-	-	-	-	<b>0.1</b>	<b>0.1</b>
<b>Total TPY</b>	<b>19.0</b>	<b>19.0</b>	<b>21.1</b>	<b>71.4</b>	<b>50.3</b>	<b>4.5</b>	<b>0.1</b>

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 CFR Part 52, Subpart A, §52.21, *Prevention of Significant Deterioration of Air Quality* rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), 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 (CO<sub>2</sub>e).

The quantity of CO<sub>2</sub>e emissions from this facility is less than 100,000 tons per year, based on the following:

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

**III. AMBIENT AIR QUALITY ANALYSIS**

Jackson previously submitted an ambient air quality impact analysis for air emission license A-91-71-V-A (dated February 18, 2011) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate Ambient Air Quality Standards (AAQS). An additional air quality impact analysis is not required for this 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 A-93-71-Y-A subject to the conditions found in Air Emission License A-93-71-X-R, and in the following conditions.

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

**THE FOLLOWING SPECIFIC CONDITION (27) SHALL BE ADDED TO AIR EMISSION LICENSE A-93-71-X-R:**

**(27) Ethylene Oxide Sterilizers**

- A. Jackson shall be licensed to remove the currently licensed ethylene oxide sterilizer, and replace it with two, 3M Steri-VC 8XL, dual cycle, gas sterilization units and two catalytic oxidizers serving each units to control EtO emissions.
- B. The ethylene oxide sterilizers and associated catalytic oxidizers shall be operated and maintained according to the manufacturer's specifications.
- C. The catalytic oxidizers shall be operated at all times one or both of the ethylene oxide sterilizers are in operation.
- D. Jackson shall calculate VOC and HAP emissions based on the number of batches, total ethylene oxide usage and an oxidizer conversion efficiency of 99%.

- E. Jackson shall maintain records documenting the number of batches processed for each unit, and total ethylene oxide usage, both on a monthly and a 12-month rolling total basis.
- F. Visible emissions from each of the catalytic oxidizers 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 three (3)-hour period.

DONE AND DATED IN AUGUSTA, MAINE THIS 20 DAY OF March, 2015.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: *Maureen Robert Cone for*  
PATRICIA W. AHO, 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: 12/22/2014

Date of application acceptance: 12/22/2014

Date filed with the Board of Environmental Protection:

This Order prepared by N. Lynn Cornfield, PE, Bureau of Air Quality.

