



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

## ENVIRONMENTAL PROTECTION DIVISION

**Richard E. Dunn, Director**

**Air Protection Branch**

4244 International Parkway  
Suite 120  
Atlanta, Georgia 30354  
404-363-7000

November 7, 2019

Eric Welch  
Plant Manager  
Sterilization Services of Georgia  
6005 Boat Rock Boulevard  
Atlanta, Georgia 30336

**Re:** Application No. 27244, Dated September 27, 2019  
Facility AIRS No.: 121-00010

Dear Mr. Welch:

Enclosed please find Air Quality Permit No. 3841-121-0010-S-03-0 for the operation of Sterilization Services of Georgia facility in Atlanta, Georgia. In particular, the permit requires the installation, operation, and monitoring of dry bed reactors to control emissions from the sterilization chamber back vents by no later than December 31, 2019. This permit also removes authorization to install proposed Sterilization Chamber CH4 and Outgassing Room AR4.

Immediately after completion of its ethylene oxide modeling review and stack test evaluation, the Division intends to require further emissions reductions from this source.

The following types of correspondence should be sent to the Division personnel indicated:

- Testing notices and test results: Dan McCain – Unit Coordinator, Stationary Source Compliance Program
- All other required notifications and reports: Sean Taylor – Program Manager, Stationary Source Compliance Program.

Thank you for your cooperation. If you have any questions or need more information, please contact me at (404) 363-7020 or via email at [eric.cornwell@dnr.ga.gov](mailto:eric.cornwell@dnr.ga.gov).

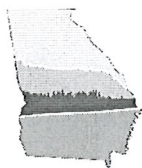
Sincerely,

Eric Cornwell  
Manager  
Stationary Source Permitting Program

Enclosure

cc:SSPP webmaster

PERMIT NO. 3841-121-0010-S-03-0  
ISSUANCE DATE: NOV 7 2019



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

## ENVIRONMENTAL PROTECTION DIVISION

### Air Quality Permit

In accordance with the provisions of the Georgia Air Quality Act, O.C.G.A. Section 12-9-1, et seq and the Rules, Chapter 391-3-1, adopted pursuant to and in effect under that Act,

**Facility Name:** Sterilization Services of Georgia  
**Facility Address:** 6005 Boat Rock Boulevard  
Atlanta, Georgia 30336 Fulton County  
**Mailing Address:** 6005 Boat Rock Boulevard  
Atlanta, Georgia 30336  
**Facility AIRS Number:** 04-13-121-00010

is issued a Permit for the following:

**Operation of an ethylene oxide sterilization facility and the construction and operation of dry bed reactors (Source Codes DB1 through DB4) to control the sterilization chamber back vents. This Permit is issued for the purpose of establishing practically enforceable emission limitations such that the facility will not be considered a major source with respect to Title V of the Clean Air Act Amendments of 1990.**

This Permit is conditioned upon compliance with all provisions of The Georgia Air Quality Act, O.C.G.A. Section 12-9-1, et seq, the Rules, Chapter 391-3-1, adopted and in effect under that Act, or any other condition of this Permit.

This Permit may be subject to revocation, suspension, modification or amendment by the Director for cause including evidence of noncompliance with any of the above; or for any misrepresentation made in Application No. 27244 dated September 27, 2019; any other applications upon which this Permit is based; supporting data entered therein or attached thereto; or any subsequent submittals or supporting data; or for any alterations affecting the emissions from this source.

This Permit is further subject to and conditioned upon the terms, conditions, limitations, standards, or schedules contained in or specified on the attached 10 pages.



  
Richard E. Dunn, Director  
Environmental Protection Division

**State of Georgia  
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**EQUIPMENT LIST**

Source Code	Description	Control Device	Description	Stack Code
CH1 CH2 CH3	13 Pallet Ethylene Oxide Gas Sterilization Chamber 8 Pallet Ethylene Oxide Gas Sterilization Chamber 13 Pallet Ethylene Oxide Gas Sterilization Chamber	1SC	Scrubber	EP4
BV1 BV2 BV3	CH1 Chamber Back Vent CH2 Chamber Back Vent CH3 Chamber Back Vent	DB1* DB2* DB3* DB4*	Dry Bed Reactors*	EP1
AR1 AR2 AR3	Enclosed Outgassing Rooms with Exhausts	1OX	Catalytic Oxidizer	EP5

\* New equipment.

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**1. General Requirements**

- 1.1 At all times, including periods of startup, shutdown, and malfunction, the Permittee shall maintain and operate this source, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Division which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection or surveillance of the source.
- 1.2 The Permittee shall not build, erect, install or use any article, machine, equipment or process the use of which conceals an emission which would otherwise constitute a violation of an applicable emission standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard that is based on the concentration of a pollutant in the gases discharged into the atmosphere.
- 1.3 The Permittee shall submit a Georgia Air Quality Permit application to the Division prior to the commencement of any modification, as defined in 391-3-1-.01(pp), which may result in air pollution and which is not exempt under 391-3-1-.03(6). Such application shall be submitted sufficiently in advance of any critical date involved to allow adequate time for review, discussion, or revision of plans, if necessary. The application shall include, but not be limited to, information describing the precise nature of the change, modifications to any emission control system, production capacity and pollutant emission rates of the plant before and after the change, and the anticipated completion date of the change.
- 1.4 Unless otherwise specified, all records required to be maintained by this Permit shall be recorded in a permanent form suitable for inspection and submission to the Division and shall be retained for at least five (5) years following the date of entry.
- 1.5 In cases where conditions of this Permit conflict with each other for any particular source or operation, the most stringent condition shall prevail.

**2. Allowable Emissions**

- 2.1 The Permittee shall not use more than 75 tons of ethylene oxide during any consecutive 12-month period.  
[40 CFR 70 Avoidance for HAP and VOC and Georgia Rule 391-3-1-.02(2)(a)(3)(ii)]
- 2.2 The Permittee shall comply with all applicable provisions of the National Emission Standard for Hazardous Air Pollutants (NESHAP) as found in 40 CFR 63 Subpart O – “Ethylene Oxide Emission Standards for Sterilization Facilities,” for the operation of the ethylene oxide sterilization equipment.  
[40 CFR 63.360]

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- 2.3 The Permittee shall comply with all applicable provisions of the National Emission Standard for Hazardous Air Pollutants (NESHAP) as found in 40 CFR 63 Subpart A – “General Provisions”.  
[40 CFR 63 Subpart A]
- 2.4 The Permittee shall reduce ethylene oxide emissions to the atmosphere from each sterilization chamber vent (Source Codes CH1, CH2, and CH3) by at least 99.0%.  
[40 CFR 63.362(c) and 40 CFR 70 Avoidance for HAP and VOC]
- 2.5 The Permittee shall reduce ethylene oxide emissions to the atmosphere from each aeration room vent (Source Codes AR1, AR2, and AR3) by at least 99.0%.  
[40 CFR 63.362(d) and 40 CFR 70 Avoidance for HAP and VOC]
- 2.6 The Permittee shall reduce ethylene oxide emissions to the atmosphere from each sterilization chamber back vent (Source Codes BV1, BV2, and BV3) by at least 99.0%, effective as of December 31, 2019.  
[40 CFR 70 Avoidance for HAP and VOC and Georgia Rule 391-3-1-.02(2)(a)(3)(ii)]
- 2.7 The emission control requirements in Condition 2.4 through 2.6 apply at all times of facility operation.  
[Georgia Rule 391-3-1-.02(2)(a)(3)(ii); 40 CFR 63 Subpart O Subsumed]

**3. Fugitive Emissions**

- 3.1 The Permittee shall take all reasonable precautions with any operation, process, handling, transportation, or storage facilities to prevent fugitive emissions of air contaminants.

**4. Process & Control Equipment**

- 4.1 Routine maintenance shall be performed on all air pollution control equipment. Maintenance records shall be recorded in a permanent form suitable and available for inspection by the Division. The records shall be retained for at least five (5) years following the date of such maintenance.
- 4.2 A spare parts inventory for control equipment shall be maintained by the Permittee.
- 4.3 Malfunctioning components of air pollution control systems shall be repaired as expeditiously as possible.

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- 4.4 Following the initial Catalytic Oxidizer (Source Code 1OX) performance test required by Condition 6.3, the Permittee shall conduct a yearly (at least once every 12 months) test during routine operations using the procedures described in 40 CFR 63.365(d) as specified in Condition 6.3. If the percent efficiency is less than 99.0 percent, the Permittee shall restore or replace the catalyst as soon as practicable but no later than 180 days after conducting the performance test. The Permittee shall notify the Division, in writing, of the date the catalyst is restored or replaced within 15 days of such action.  
[40 CFR 63.363(b)(4)]

**5. Monitoring**

- 5.1 Any continuous monitoring system required by the Division and installed by the Permittee shall be in continuous operation and data recorded during all periods of operation of the affected facility except for continuous monitoring system breakdowns and repairs. Monitoring system response, relating only to calibration checks and zero and span adjustments, shall be measured and recorded during such periods. Maintenance or repair shall be conducted in the most expedient manner to minimize the period during which the system is out of service.  
[391-3-1-.02(6)(b)1.]
- 5.2 The Permittee shall install, calibrate, maintain, and operate a system to continuously monitor and record oxidation temperature at the outlet of a catalyst bed for the Catalytic Oxidizer (Source Code 1OX). The temperature monitoring shall be accurate within  $\pm 5.6$  degrees Celsius ( $\pm 10$  degrees Fahrenheit). The system shall meet any applicable performance specifications(s) of the Division's monitoring requirements. Prior to the performance test required by Condition 6.3, the 24-hour average oxidation temperature shall be 269 degrees or higher. Following the performance test required by Condition 6.3, the minimum average temperature shall not be less than the minimum oxidation temperature established in accordance with Condition 6.3.
- 5.3 The Permittee shall verify the accuracy of the temperature monitor required by Condition No. 5.2 twice each calendar year with a reference temperature monitor (traceable to National Institute of Standards and Technology (NIST) standards or an independent temperature measurement device dedicated for this purpose). During accuracy checking, the probe of the reference device shall be at the same location as that of the temperature monitor being tested. As an alternative, the accuracy temperature monitor may be verified in a calibrated oven (traceable to NIST standards).  
[40 CFR 63.364(c)(4)]

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5.4 The Permittee shall measure and record the scrubber liquor level weekly in the recirculation tank for the Scrubber (Source Code 1SC). The Permittee shall install, maintain, and use a liquid level indicator to measure the scrubber liquor tank level (i.e. a marker on the tank wall, a dipstick, a magnetic indicator, etc.). Monitoring is required during a week only if the scrubber unit has been operated. Prior to the performance test required by Condition 6.2, the level of the scrubber liquor recirculation tank shall be maintained at or below 9,200 gallons. Following the performance test required by Condition 6.2, the maximum level shall not exceed the level determined by the performance test or subsequent performance testing.

[40 CFR 63.364(b)(2)]

5.5 The Permittee shall maintain and operate the Dry Bed Reactors (Source Codes DB1 through DB4) to ensure an ethylene oxide reduction of 99.0% from the sterilization chamber back vents (Source Codes BV1, BV2, and BV3), effective on and after December 31, 2019:

[391-3-1-.02(6)(b)1.]

- a. Once per week the Permittee shall collect and record the concentration of a 15-minute ethylene oxide sample from the inlet and the outlet of the dry bed reactors. The reduction efficiency shall be calculated by comparing the ethylene oxide loading into the dry bed reactors to the ethylene oxide loading exiting the dry bed reactors. If the reduction efficiency is less than 99.1%, the Permittee shall replace the dry bed material within 15 days. The dates of dry bed material replacement shall be recorded and kept in a form suitable for inspection or submission to the Division.
- b. When the Permittee is sampling in accordance this Condition, the ethylene oxide loading to the dry bed reactors, the ethylene oxide loading out of the dry bed reactors, and the dry bed reactor system reduction efficiency shall be recorded within 3 hours of the sampling event. These records shall be kept in a form suitable for inspection or submission to the Division.

## **6. Performance Testing**

6.1 The Permittee shall cause to be conducted a performance test at any specified emission point when so directed by the Division. The following provisions shall apply with regard to such tests:

- a. All tests shall be conducted and data reduced in accordance with applicable procedures and methods specified in the Division's Procedures for Testing and Monitoring Sources of Air Pollutants.
- b. All test results shall be submitted to the Division within sixty (60) days of the completion of testing.

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- c. The Permittee shall provide the Division thirty (30) days prior written notice of the date of any performance test(s) to afford the Division the opportunity to witness and/or audit the test, and shall provide with the notification a test plan in accordance with Division guidelines.
  - d. All monitoring systems and/or monitoring devices required by the Division shall be installed, calibrated and operational prior to conducting any performance test(s). For any performance test, the Permittee shall, using the monitoring systems and/or monitoring devices, acquire data during each performance test run. All monitoring system and/or monitoring device data acquired during the performance testing shall be submitted with the performance test results.
- 6.2 Within 60 days of issuance of this permit, the Permittee shall conduct ethylene oxide performance testing on the sterilization chamber vents (Source Codes CH1, CH2, and CH3). The testing shall be conducted according to the procedures listed in 40 CFR 63.7 according to the applicability in Table 1 of 40 CFR 63.360, the procedures listed in 40 CFR 63.363, and the test methods listed in 40 CFR 63.365. The test shall be used to establish the maximum liquor tank level for the Scrubber (Source Code 1SC). The test report shall list the final exhaust mass emission rate of ethylene oxide and the control efficiency of the scrubber. The testing shall be repeated at least once every 12 months.  
[40 CFR 63.363 and 63.365]
- 6.3 Within 60 days of issuance of this permit, the Permittee shall conduct ethylene oxide performance testing on the aeration room vents (Source Codes AR1, AR2, and AR3). The testing shall be conducted according to the procedures listed in 40 CFR 63.7 according to the applicability in Table 1 of 40 CFR 63.360, the procedures listed in 40 CFR 63.363, and the test methods listed in 40 CFR 63.365. The test shall be used to establish the minimum oxidation temperature for the Catalytic Oxidizer (Source Code 1OX). The test report shall list the final exhaust mass emission rate of ethylene oxide and the control efficiency of the catalytic oxidizer. The testing shall be repeated at least once every 12 months.  
[40 CFR 63.363 and 63.365]
- 6.4 Within 60 days of completion of routing the sterilization chamber back vents (Source Codes BV1, BV2, and BV3) to the Dry Bed Reactors (Source Codes DB1 through DB4), the Permittee shall conduct ethylene oxide performance testing of the system according to the procedures listed in 40 CFR 63.7 according to the applicability in Table 1 of 40 CFR 63.360, the procedures listed in 40 CFR 63.363, and the test methods listed in 40 CFR 63.365. The test report shall list the final exhaust mass emission rate of ethylene oxide and the control efficiency of the dry bed reactors. The testing shall be repeated at least once every 12 months.  
[Georgia Rule 391-3-1-.02(2)(a)(3)(ii); 40 CFR 63.363 and 63.365]



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**7. Notification, Reporting and Record Keeping Requirements**

- 7.1 The Permittee shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility, any malfunction of the air pollution control equipment or any periods during which a continuous monitoring system or monitoring device is inoperative. The Permittee shall retain these records for a period of at least five (5) years after the date of any such startup, shutdown, or malfunction.  
[391-3-1-.02(6)(b)1.]
- 7.2 The Permittee shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this Permit. The information shall be recorded in a permanent form suitable and available for inspection and shall be retained for at least five (5) years following the date of such measurements maintenance, reports, and records.  
[391-3-1-.02(6)(b)1.]
- 7.3 The data acquisition system for the temperature monitor required by Condition 5.2 shall compute and record a daily average oxidation temperature from the 12-minute or shorter period temperature values. Strip chart data shall be converted to record a daily average oxidation temperature each day any instantaneous temperature recording falls below the minimum temperature.  
[40 CFR 63.364(c)]
- 7.4 The Permittee shall comply with the recordkeeping provisions of 63.367(d) for the Catalytic Oxidizer (APCD ID No. 1OX).  
[40 CFR 63.367(d)]
- 7.5 The Permittee shall maintain general records and continuous monitoring system records as specified in 40 CFR 63.10(b)(2), respectively, and Table 1 of 40 CFR 63 Subpart O.  
[40 CFR 63.366(a)]
- 7.6 The Permittee shall submit written reports semiannually, divided monthly, in accordance with Section 1.4 of the Division's Procedure for Testing and Monitoring Sources of Air Pollutants, 40 CFR 63 Subpart O, and 40 CFR 63 Subpart A as appropriate, of all operating parameter deviations and all periods of monitoring system downtime for the following control device systems. The report shall cover each semiannual period ending June 30 and December 31 of each year and shall be postmarked by August 29 and February 28, respectively. Operating parameter deviations are defined as follow:
- a. Any reading of the scrubber liquor recirculation tank level for the Scrubber (Source Code ISC) that is above 9,200 gallons, or, following a test required by Condition 6.2, any reading that is above the maximum level established in accordance with Condition 6.2.

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- b. Any 24-hour average of the oxidation temperature for the Catalytic Oxidizer (Source Code 1OX) that is less than 269 degrees Fahrenheit or, following a test required by Condition 6.3, any 24-hour average during which the oxidation temperature is less than the minimum established in accordance with Condition 6.3.
  - c. For the Dry Bed Reactors (Source Codes DB1 through DB4), any occurrence when the bag samples indicate that the system efficiency is less than 99.1%.
  - d. For the Dry Bed Reactors (Source Codes DB1 through DB4), any instance when the dry bed material is not replaced in accordance with Condition 5.5.a.
- 7.7 The Permittee shall maintain records of the amount (in pounds) of ethylene oxide introduced into the sterilization chambers (Source Codes CH1, CH2, and CH3) each day. The Permittee shall maintain these records on site at all times in a format suitable and available for inspection by or submittal to the Division on request.  
[391-3-1-.02(6)(b)1.]
- 7.8 The Permittee shall use the ethylene oxide records specified in Condition 7.7 to calculate the total ethylene oxide usage for each calendar month in tons. All demonstration calculations shall be kept as part of the records required in this condition. The Permittee shall notify the Division in writing if ethylene oxide usage exceeds 6.25 tons during any calendar month. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to maintain compliance with the limit in Condition 2.1. The Permittee shall maintain these records on site at all times in a format suitable and available for inspection by or submittal to the Division on request.  
[391-3-1-.02(6)(b)1.]
- 7.9 The Permittee shall use the calculations required by Condition 7.8 to determine the 12-month rolling total ethylene oxide usage for each calendar month in tons. The Permittee shall notify the Division in writing if ethylene oxide usage exceeds 75 tons during any consecutive 12-month period. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to attain compliance with the limit in Condition 2.1. The Permittee shall maintain these records on site at all times in a format suitable and available for inspection by or submittal to the Division on request.  
[391-3-1-.02(6)(b)1.]

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7.10 The Permittee shall calculate the monthly ethylene oxide emissions from the facility, using the following equation:

$$E = \text{Usage} * \{[(1-\text{CEs}) * 95\%] + [(1-\text{CEc}) * 4\%] + [1-\text{CED}] * 1\%\}$$

Where:

E= Monthly emission in pounds of EtO (pounds)

Usage = Monthly usage in pounds of EtO (pounds)

CEs = Control efficiency of the chamber vent scrubber as determined by testing in accordance with Condition 6.2

CEc = Control efficiency of the aeration room catalytic oxidizer as determined by testing in accordance with Condition 6.3

CEd = Control efficiency of the back vent dry bed reactor as determined by testing in accordance with Condition 6.4

Until the stack testing results (as required in Conditions 6.2, 6.3, and 6.4) have been submitted to the Division, the control efficiency of each device shall be assumed to be 99.0%.

7.11 The Permittee shall include the following information in the semiannual report required by Condition 7.6.

[391-3-1-.02(6)(b)1.]

- a. Total (in tons) of ethylene oxide usage for each month in the reporting period and the 12-month rolling total of ethylene oxide usage for each month in the reporting period, as calculated in accordance with Conditions 7.8 and 7.9.
- b. Total (in tons) of ethylene oxide emissions for each month in the reporting period and the 12-month rolling total of ethylene oxide usage for each month in the reporting period, as calculated in accordance with Condition 7.10.

7.12 The Permittee shall provide written notification of the actual date of initial startup of the Dry Bed Reactors (Source Codes DB1 through DB4), delivered or postmarked within 15 calendar days after that date.

[391-3-1-.02(6)(b)1.]

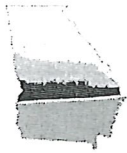
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**8. Special Conditions**

- 8.1 At any time that the Division determines that additional control of emissions from the facility may reasonably be needed to provide for the continued protection of public health, safety and welfare, the Division reserves the right to amend the provisions of this Permit pursuant to the Division's authority as established in the Georgia Air Quality Act and the rules adopted pursuant to that Act.
- 8.2 The Permittee shall calculate and pay an annual Permit fee to the Division. The amount of the fee shall be determined each year in accordance with the "Procedures for Calculating Air Permit Fees."
- 8.3 Georgia Air Quality Permit No. 3841-121-0010-S-02-0 and all associated amendments are hereby revoked in their entirety.



**NARRATIVE**

TO: Eric Cornwell  
FROM: Heather Brown  
DATE: October 31, 2019

Facility Name: **Sterilization Services of Georgia**  
AIRS No.: 12100010  
Location: Atlanta, GA (Fulton County)  
Application #: 27244  
Date of Application: September 27, 2019

**Background Information**

Sterilization Services of Georgia is an ethylene oxide (EtO) sterilization facility located at 6005 Boat Rock Boulevard, Atlanta, Georgia (Fulton County). The facility operates under Air Quality Permit No. 3841-121-0010-S-02-0 and one amendment. The facility is subject to 40 CFR 63 Subpart O – Ethylene Oxide Emission Standards for Sterilization Facilities.

The purpose of the new permit is to control the sterilization chamber back vents, which are not required to be controlled by 40 CFR 63 Subpart O, as quickly as possible. Additional air quality controls may be required as described in a letter to be issued to the facility in conjunction with the new permit. The new permit also removes authorization to install and operate a fourth sterilization chamber (Source Code CH4) and a fourth aeration room (Source Code AR4).

**Process Description**

The Sterilization Services process introduces EtO gas, under vacuum, into a sealed chamber (Source Codes CH1, CH2, and CH3) that contains packaged products to be sterilized. The products are typically pre-humidified, generally at elevated temperatures, prior to the introduction of EtO into the evacuated chamber. EtO is then introduced and continuously recirculated in the chamber open space. Some of the EtO is also absorbed by the product and packaging. The product is exposed to the gas for controlled periods of time that are known to destroy any biological contaminants that may have become part of the product or product packaging. At the end of the sterilization cycle, most of the EtO is evacuated from the chamber and sent to a liquid scrubber (Source Code 1SC). The scrubber mixes EtO with an acid/water solution that converts the gas to ethylene glycol.

After the sterilization process is complete, product is removed from the chamber and transported to aeration rooms (Source Codes AR1, AR2, and AR3) where air is continuously recirculated around the product. A portion of the recirculating air containing outgassed EtO is continuously removed from the aeration room by exhaust blowers. This residual stream is sent to a catalytic oxidizer (Source Code 1OX), which destroys the EtO via combustion.

### Purpose of Application

Application No. 27244 was received on September 25, 2019. A public advisory was not required because the project will result in a reduction in emissions.

The purpose of the application is to reduce EtO emissions by adding dry bed reactors (Source Codes DB1 through DB4) to control emissions from the sterilization chamber back vents (Source Codes BV1, BV2, and BV3). The emissions from the back vents are the amount of EtO left in the chamber after evacuation to the liquid scrubber. The emissions occur as the door to the chamber is open at the end of the sterilization process. The back vents are not required to be controlled under 40 CFR 63 Subpart O. The proposed project is being taken voluntarily to reduce facility emissions. There will be no change in the sterilization process as a result of the project. The new permit requires the back vents to be controlled by 99.0%.

### Updated Equipment List

The equipment list has been updated to include the new control equipment.

Source Code	Description	Control Device	Description	Stack Code
CH1 CH2 CH3	13 Pallet Ethylene Oxide Gas Sterilization Chamber 8 Pallet Ethylene Oxide Gas Sterilization Chamber 13 Pallet Ethylene Oxide Gas Sterilization Chamber	ISC	Scrubber	EP4
BV1 BV2 BV3	CH1 Chamber Back Vent CH2 Chamber Back Vent CH3 Chamber Back Vent	DB1* DB2* DB3* DB4*	Dry Bed Reactors*	EP1
AR1 AR2 AR3	Enclosed Outgassing Rooms with Exhausts	IOX	Catalytic Oxidizer	EP5

\* New equipment.

### Emissions Summary

Emissions from the source have been calculated based on usage of 75 tons per year of EtO. This value reflects maximum annual usage given the 3 existing chambers (the proposed 4<sup>th</sup> chamber is removed from the permit in this action). EtO is classified as a hazardous air pollutant (HAP) and a volatile organic compound (VOC). Emissions will be reduced as a result of the project. The emission calculations do not include fugitive emissions released into the indoor work space area.

- The facility is required by 40 CFR 63 Subpart O to reduce emissions of EtO from the sterilization chamber vents by 99.0%. The facility is in compliance with this requirement.
- The facility is required by 40 CFR 63 Subpart O to reduce emissions of EtO from the aeration chamber vents by 99.0%. The facility is in compliance with this requirement.
- Reductions in emissions will be achieved by installing dry bed reactors to control emissions from the chamber back vents. This is voluntary and is not a requirement of 40 CFR 63 Subpart O. The permit requires a reduction of 99.0%.

**Facility-Wide Emissions (tons per year)\***

Pollutant	Potential Emissions		
	Before Mod.	After Mod.	Emissions Change
PM/PM <sub>10</sub> /PM <sub>2.5</sub>	0	0	0
NO <sub>x</sub>	0	0	0
SO <sub>2</sub>	0	0	0
CO	0	0	0
VOC	1.5	0.75	-0.75
Max. Individual HAP	1.5	0.75	-0.75
Total HAP	1.5	0.75	-0.75

\* Not including any fugitive emissions associated with workspace or product warehouse.

***Pre-Modification Calculations***

Potential emissions before the modification are based on 75 tons (150,000 pounds) per year of EtO usage, and 99.0% minimum control of the sterilization chamber vacuum pump vents and the aeration room vents. The usage of 75 tpy, rather than the 168 tpy listed in the original permit application, is used because the maximum usage, without the proposed 4<sup>th</sup> chamber, is 75 tpy. Furthermore, 1% of usage is vented through back vents, and 4% usage is vented through aeration as detailed in the US EPA rulemaking preamble to the 2001 amendments to 40 CFR 63 Subpart O - 66 FR 55577 (EPA cites 1% and 3%, respectively).  
<https://www.federalregister.gov/documents/2001/11/02/01-27594/ethylene-oxide-emissions-standards-for-sterilization-facilities>

The pre-modification EtO emissions are calculated as follows:

$$E = \text{Usage} * \{[A * (1-.99)] + [B * (1-.99)] + [C]\}$$

Where:

- E = Yearly emissions in pounds of EtO;
- Usage = Yearly usage in pounds of EtO;
- A = Fraction vented through chamber vacuum pumps: 95%;
- B = Fraction vented through aeration: 4%; and
- C = Fraction vented through the back vents: 1%.

$$E = 150,000 \{[0.95 * (1-.99)] + [0.04 * (1-.99)] + [0.01]\}$$

$$E = 3,000 \text{ pounds EtO per year ( 1.5 tons per year)}$$

***Post-Modification Calculations***

Potential emissions after the modification are based on 75 tons (150,000 pounds) per year of EtO usage and 99% control of the sterilization chamber vacuum pump vents, aeration room vents, and chamber back vents.

The post-modification EtO emissions are calculated as follows:

$$E = \text{Usage} * \{[A * (1-.99)] + [B * (1-.99)] + [C*(1-.99)]\}$$

Where:

- E = Yearly emission in pounds of EtO;  
 Usage = Yearly usage in pounds of EtO;  
 A = Fraction vented through chamber vacuum pumps: 95%;  
 B = Fraction vented through aeration: 4%; and  
 C = Fraction vented through the back vents: 1%.

$$E = 150,000 * \{[0.95 * (1-.99)] + [0.04 * (1-.99)] + [0.01*(1-.99)]\}$$

$$E = 1500 \text{ pounds EtO per year ( 0.75 tons per year)}$$

Actual emissions are expected to be significantly lower, based on performance test results that show the true control efficiencies of both the scrubber and the catalytic oxidizer to be greater than 99.9%.

### **Regulatory Applicability**

Sterilization Services is subject to 40 CFR 63 Subpart O – Ethylene Oxide Emissions Standards for Sterilization Facilities. The regulation requires the following:

- The facility must reduce emissions from each sterilization chamber vacuum pump vent by at least 99% in accordance with 40 CFR 63.362(a) and (c). The facility is in compliance with this provision.
- The facility must reduce emission from each aeration room by at least 99% or to a maximum outlet concentration of 1 part per million by volume, whichever is less stringent in accordance with 40 CFR 63.62(a) and (d). The facility is in compliance with this provision.

The new permit will require 99.0% control of the back vents (Source Codes BV1, BV2, and BV3), which are not required to be controlled by 40 CFR 63 Subpart O.

### **Testing and Monitoring**

The permit will require the facility to conduct performance testing for the sterilization chamber pump vents, the aeration room vents, and the back vents. The testing will be repeated on an annual basis. The facility will conduct periodic monitoring to demonstrate ongoing compliance.

#### *Scrubber*

The liquid scrubber (Source Code 1SC) controls EtO emissions from the sterilization chamber vacuum pump vents. The facility is required to conduct a performance test within 60 days of issuance of the new permit. The test will establish the maximum scrubber liquor tank level. The facility is required to monitor the level on a weekly basis.

#### *Catalytic Oxidizer*

The catalytic oxidizer (Source Code 1OX) controls EtO emissions from the aeration room vents. The facility is required to conduct a performance test within 60 days of issuance of the new permit. The test will establish the minimum oxidation temperature for the oxidizer. The facility is required to monitor the oxidizer temperature continuously.



### *Dry Bed Reactors*

The new dry bed reactors (Source Codes DB1 through DB4) will control EtO emissions from the sterilization chamber back vents. The facility is required to conduct a performance test within 60 days of routing the back vents to the dry bed reactors. The facility is required to monitor the beds by taking weekly samples at the inlet and outlet of the dry bed reactors to determine the reduction efficiency.

### **Permit Conditions**

Conditions 1.1 through 1.5 are general requirements that apply to all facilities.

Condition 2.1 limits the EtO usage at the facility to 75 tons per consecutive 12-month period, much lower than the 168 tons per year originally estimated. 75 tons per year reflects the maximum usage given the current 3-chamber configuration.

Conditions 2.2 and 2.3 require the facility to comply with 40 CFR 63 Subpart A – General Provisions and 40 CFR 63 Subpart O – Ethylene Oxide Emission Standards for Sterilization Facilities.

Conditions 2.4 and 2.5 specify the EtO control requirements under 40 CFR 63 Subpart O. The 1 ppm option for the aeration rooms has been removed because it is less stringent than the 99.0% option.

Condition 2.6 is a new requirement specifying the control requirements for the sterilization chamber back vents. The controls are voluntary and are not required by 40 CFR 63 Subpart O. The deadline to have dry beds installed and operating is December 31, 2019, as indicated by the effective date of the condition.

Condition 2.7 requires control of the ethylene oxide vents at all times of facility operation.

Condition 3.1 is a standard fugitive emission requirement that applies to all sources.

Conditions 4.1 through 4.3 are standard air pollution control equipment requirements that apply to all sources.

Condition 4.4 requires the facility to comply with work practice standards for the oxidizer catalyst by testing yearly and replacing or restoring the catalyst as necessary. This is a requirement of 40 CFR 63 Subpart O.

Condition 5.1 is a standard monitoring condition that applies to all sources.

Condition 5.2 requires the facility to continuously monitor the outlet temperature for the catalytic oxidizer. This is a requirement of 40 CFR 63 Subpart O. This condition also establishes the minimum operating temperature of 269°F derived from the most recent performance test.

Condition 5.3 requires the facility to verify the accuracy of the monitor used to monitor the temperature for the catalytic oxidizer. This is a requirement of 40 CFR 63 Subpart O.

Condition 5.4 requires the facility to measure and record the scrubber liquor level on a weekly basis. This is a requirement of 40 CFR 63 Subpart O. This condition also establishes the maximum scrubber liquor amount of 9,200 gallons derived from the most recent performance test.

Condition 5.5 is a new requirement for the voluntary back vent controls. The facility must use weekly samples to demonstrate compliance with the minimum efficiency of 99.0%. To ensure a quick response

time to any potential control device issues, this condition requires that the value be recorded within 3 hours after the sample was physically taken. The value of 3 hours was selected by EPD to ensure a timely response but allows flexibility.

Condition 6.1 lists standard testing requirements that apply to all sources.

Conditions 6.2 through 6.4 require the facility to conduct performance tests for the existing vents and for the new Dry Bed Reactors. The facility is required to establish the operating parameter for the scrubber and the minimum temperature for the catalytic oxidizer. The testing is to be repeated once every 12 months.

Conditions 7.1 and 7.2 are standard record keeping requirements that apply to all sources.

Condition 7.3 is a requirement of 40 CFR 63 Subpart O and specifies how the oxidation temperature data should be handled and how the daily average shall be calculated.

Condition 7.4 requires the facility to keep records for the catalytic oxidizer as required by 40 CFR 63 Subpart O. The records include compliance test records, data analysis records, and catalyst replacement records.

Conditions 7.5 and 7.6 require the facility to maintain general records and to submit semiannual reports to demonstrate compliance with 40 CFR 63 Subpart O. Reporting includes occurrences of deviations for scrubber tank level and catalytic oxidizer temperature as well as dry bed reactor control efficiency. It is also a deviation if the facility fails to replace the dry bed reactors as required by the permit.

Condition 7.7 requires the facility to maintain records of the amount of EtO used daily.

Conditions 7.8 and 7.9 require the facility to maintain records of EtO usage on a monthly and 12-month rolling basis. The records will be used to demonstrate compliance with the EtO usage limit. The conditions also require the Permittee to report when monthly usage exceed 1/12<sup>th</sup> of the limit and if the 12-month rolling limit is exceeded.

Condition 7.10 requires the Permittee to calculate actual monthly EtO emissions. The equation to be used relies on actual usage, and tested control efficiencies. Until the tests required in Section 6 are completed and submitted to EPD, the Permittee must use the conservative control efficiency of 99%.

Condition 7.11 requires the Permittee to include the monthly EtO usage and emissions in the semiannual report.

Condition 7.12 requires the facility to notify the Division of the date of startup of the new dry bed reactors.

Condition 8.1 is a standard requirement that applies to all sources.

Condition 8.2 requires the facility to pay annual fees.

Condition 8.3 revokes the permits previously issued to the source.

**Toxic Impact Assessment**

Application No. 27244 is an emissions reduction project. The EPD risk assessment of EtO from the source is separate from this permit action.

**Summary & Recommendations**

A public advisory was not required for Application No. 27244 because the project results in a reduction in emissions from the source. The facility continues to be classified as a synthetic minor source and continues to comply with the provisions of 40 CFR 63 Subpart O. Compliance responsibility is maintained by the Stationary Source Compliance Program in the Atlanta office. I recommend the issuance of Air Quality Permit No. 3841-121-0010-S-03-0 for the emission reduction project as described in Application No. 27244.