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

DEPARTMENT ORDER

AHJRLLFG LLC **Penobscot County** **Old Town, Maine** **A-1150-71-F-A**	**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

AHJRLLFG LLC (Archaea) was issued Air Emission License A-1150-71-A-N on February 24, 2020, for the operation of emission sources associated with a renewable natural gas (RNG) processing facility. The license was subsequently amended as follows:

Amendment #	Date Issued	Brief Description
A-1150-71-B-M	8/24/2021	Extend the deadline to commence construction
A-1150-71-C-A	10/21/2022	Address several changes to the proposed project emission units and to allow the facility to begin operation prior to the natural gas pipeline being extended
A-1150-71-D-A	9/25/2023	Add Emergency Generator #9
A-1150-71-E-M	9/30/2024	Replacement of Flare #1 with Flare #2

The equipment addressed in this license amendment is located at 2828 Bennoch Road, Old Town, Maine.

Archaea has requested an amendment to their license in order to increase the licensed emissions of sulfur dioxide (SO_2) from Flare #2 and the thermal oxidizer (TO #1).

B. Emission Equipment

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

Fuel Burning Equipment

Equipment	Max. Capacity (MMBtu/hr)	Fuel Type	Date of Manuf.
TO #1	12	natural gas/propane tail gas	2022
Flare #2	192.0	natural gas/propane off-spec gas	2024

Process Equipment

Equipment	Production Rate
Gas Conversion Plant	3,200 scfm

C. Definitions

Records or *Logs* mean either hardcopy or electronic records.

D. 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 Emissions" 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	3.9	3.9	–	100
PM_{10}	3.9	3.9	–	100
$PM_{2.5}$	3.9	3.9	–	100
SO_2	3.1	22.6	+19.5	100
NO_x	50.1	50.1	–	100
CO	78.5	78.5	–	100
VOC	19.7	19.7	–	100

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

E. Facility Classification

With the limits on annual throughput for Flare #2 and limits on SO_2 emissions from TO #1 and Flare #2, the facility is licensed as follows:

- As a synthetic minor source of air emissions for criteria pollutants, because Archaea is subject to license restrictions that keep facility emissions below major source thresholds for SO_2 and CO; 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. SO_2 from TO #1 and Flare #2

Archaea operates a Gas Conversion Plant that removes diluents and contaminants from landfill gas (LFG) to produce a gas which meets pipeline quality standards for natural gas. Diluents and contaminants removed from the LFG include (among others) total reduced sulfur (TRS) compounds, non-methane organic compounds (NMOC or VOC), oxygen, nitrogen, and carbon dioxide.

TRS, primarily hydrogen sulfide (H_2S), is removed from the gas stream through use of non-regenerative carbon scrubbers. The remaining contaminants described above (mostly CO_2, VOC, nitrogen, and oxygen) form a waste gas stream (tail gas) that is combusted in a thermal oxidizer (TO #1).

Gas that is produced but does not meet pipeline specifications (e.g., too-low methane content) is considered off-spec gas. Any off-spec gas is combusted in a traditional landfill gas flare (Flare #2).

The use of carbon scrubbers followed by combustion in either TO #1 or Flare #2 was found to represent BACT for emissions of H_2S and SO_2 from the Gas Conversion Plant in Air Emissions Licenses A-1150-71-C-A (issued 10/21/2022) and A-1150-71-E-M (issued 9/30/2024).

Any TRS combusted in either TO #1 or Flare #2 is converted and released as SO_2. As described above, any tail gas or off-spec production gas must first be treated by the carbon scrubbers to limit the concentration of H_2S in the gas to 25 ppmdv or less on a 12-month rolling average basis. Archaea monitors the tail gas exiting the carbon scrubbers for H_2S on a weekly basis. On an annual basis, Archaea does more in-depth testing to determine the concentration of both H_2S and TRS in the gas exiting the carbon scrubbers.

In prior licensing actions, Archaea assumed that the carbon scrubbers would limit both H_2S and TRS to 25 ppmdv. However, recent sampling demonstrates that, although the scrubbers limit H_2S concentrations to below the detection limit of 0.10 ppmdv, the TRS concentration in the treated gas was in the range of 80 – 100 ppmdv, which could result in potential exceedances of the SO_2 emission limits for TO #1 and Flare #2. Archaea has proposed basing the potential to emit (PTE) emissions of SO_2 from TO #1 and Flare #2 on a TRS concentration of 200 ppmdv, roughly double the concentration seen at the most recent test.

BACT for emissions of SO_2 from TO #1 and Flare #2 was reconsidered based on the updated PTE. Use of the carbon scrubbers as designed to limit H_2S emissions to 25 ppmdv or less is still the most efficient system for removal of sulfur compounds from the gas. Additional controls for SO_2 are not technically or economically feasible.

The Department finds BACT for SO_2 emissions from the Gas Conversion Plant is the use of carbon scrubbers, an H_2S concentration limit exiting the carbon scrubbers of 25 ppmdv on a 12-month rolling average basis, a combined annual SO_2 limit of 22.3 tpy for TO #1 and Flare #2 on a 12-month rolling total basis, and the emission limits listed in the tables below for all operating times.

Compliance with the H_2S ppmdv limit shall be demonstrated by sampling the concentration of the H_2S in the tail gas exiting the control equipment (i.e., the carbon scrubber outlet) at least once per calendar week using a handheld monitor or equivalent. Weekly measurements shall be used to develop a monthly average. The handheld monitor or equivalent shall be operated, calibrated, and maintained in accordance with the manufacturer's specifications.

Compliance with the annual SO_2 limit for TO #1 and Flare #2 shall be demonstrated by annual testing of the tail gas exiting the control equipment (i.e., the carbon scrubber outlet) and monthly records of the amount (scf) of gas sent to each unit.

At least annually, Archaea shall test the gas exiting the carbon scrubbers three times during a single day using ASTM Test Method D5504, or other methods as approved by the Department, to analyze for H_2S and TRS. Concurrent with the annual test, measurements

of H_2S shall be taken with the handheld monitor or equivalent. If the results of the handheld (or equivalent) sampling do not correspond within 5 ppm of the annual test results, Archaea shall reassess/replace/recalibrate the handheld monitor, or equivalent, as appropriate to obtain valid sampling results. The annual test for H_2S shall be repeated to confirm the handheld monitor corresponds to within 5 ppm.

Archaea shall keep records of any maintenance activities performed (planned or unplanned) on TO #1, Flare #2, and the carbon scrubbers.

The BACT emission limits for TO #1 are based on the following:

PM/PM_{10}	–	0.00765 lb/MMBtu based on AP-42 Table 1.5-1 dated 7/08
SO_2	–	based on combusting gas with a TRS content of 200 ppmdv
NO_x	–	0.142 lb/MMBtu based on AP-42 Table 1.5-1 dated 7/08
CO	–	0.20 lb/MMBtu based on manufacturer data
VOC	–	20 ppmdv per manufacturer data
Visible Emissions	–	06-096 C.M.R. ch. 115, BACT

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

$PM/PM_{10}/PM_{2.5}$	–	17 lb/MMscf of methane based on AP-42 Table 2.4-5 dated 11/98
SO_2	–	based on combusting gas with a TRS content of 200 ppmdv
NO_x	–	0.068 lb/MMBtu based on AP-42 Table 13.5-1 dated 2/18
CO	–	0.31 lb/MMBtu based on AP-42 Table 13.5-2 dated 2/18
VOC	–	340.47 ppmdv based on manufacturer specs
Visible Emissions	–	06-096 C.M.R. ch. 115, BACT

The BACT emission limits for TO #1 and Flare #2 are the following:

Unit	Pollutant	lb/MMBtu
TO #1	PM	0.008
Flare #2	PM	0.02

Unit	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
TO #1	0.09	0.09	0.09	3.24*	1.70	2.40	0.70
Flare #2	3.23	3.23	3.23	13.00*	13.06	59.52	0.63

*12-month rolling average basis

Visible emissions from TO #1 and Flare #2 each shall not exceed 10% opacity on a six-minute block average basis. Compliance shall be demonstrated by testing in accordance with 40 C.F.R. Part 60, Appendix A, Method 9 upon request by the Department.

The Department has determined that the BACT visible emission limits above are more stringent than the applicable limit in 06-096 C.M.R. ch. 101. Therefore, the visible emission limits for TO #1 and Flare #2 have been streamlined to the more stringent BACT limit, and only this more stringent limit shall be included in the air emission license.

C. Performance Test Protocol

For any performance testing required by this license, Archaea shall submit to the Department for approval a performance test protocol, as outlined in the Department's Performance Testing Guidance, at least 30 days prior to the scheduled date of the performance test. [06-096 C.M.R. ch. 115, BPT]

The Department's Performance Testing Guidance is available online at:
https://www.maine.gov/dep/air/emissions/testing.html

D. Emission Statements

Archaea is subject to emissions inventory requirements contained in *Emission Statements*, 06-096 C.M.R. ch. 137. Archaea shall maintain the following records in order to comply with this rule:

1. The amount of natural gas/propane and tail gas combusted in TO #1 on a monthly and calendar year basis;
2. The amount of natural gas/propane and off-spec gas combusted in Flare #2 on a monthly and calendar year basis;
3. The sulfur content of the tail gas combusted in TO #1 and the off-spec gas combusted in Flare #2 based on annual testing of TRS;
4. The amount of distillate fuel fired in each generator (Generators #1 - #9) on a monthly and calendar year basis;
5. The sulfur content of the distillate fuel fired in the generators;
6. The amount of natural gas fired in each compressor (Compressors #1 - #2) on a monthly and calendar year basis;
7. Calculations of the annual VOC, greenhouse gases (GHG), and HAP emissions from gas releases and fugitive emissions;
8. Hours each emission unit was active or operating on a monthly and calendar year basis; and
9. Any other record necessary to comply with the requirements of 06-096 C.M.R. ch. 137.

Every third year, or as requested by the Department, Archaea shall report to the Department emissions of hazardous air pollutants as required pursuant to 06-096 C.M.R. ch. 137, § (3)(C). The next report is due no later than May 15, 2027, for emissions occurring in

calendar year 2026. The Department will use these reports to calculate and invoice for the applicable annual air quality surcharge for the subsequent three billing periods. Archaea shall pay the annual air quality surcharge, calculated by the Department based on these reported emissions of hazardous air pollutants, by the date required in Title 38 M.R.S. § 353-A(3).
[38 M.R.S. § 353-A(1-A)]

E. 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 and establishing the facility's potential to emit (PTE). Only licensed equipment is included, i.e., emissions from insignificant activities are excluded. Similarly, unquantifiable fugitive particulate matter emissions are not included except when required by state or federal regulations. Maximum potential emissions were calculated based on the following assumptions:

- Operating Generators #1 - #8, Compressors #1 - #2, and TO #1 at full capacity for 8,760 hr/year each;
- Firing 243,000 MMBtu/year in Flare #2;
- A TRS Concentration of 200 ppmdv in the gas combusted in TO #1 and Flare #2;
- Operating Generator #9 for 100 hr/year; and
- A VOC limit of 5.0 tpy for gas releases and fugitive emissions.

This information does not 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}	$PM_{2.5}$	SO_2	NO_x	CO	VOC
Generators #1 - #8	1.3	1.3	1.3	0.3	30.0	22.4	8.5
Compressors #1 - #2	0.2	0.2	0.2	–	3.9	7.8	2.7
TO #1	0.4	0.4	0.4	14.2	7.5	10.5	3.1
Flare #2	2.0	2.0	2.0	8.1	8.3	37.7	0.4
Generator #9	–	–	–	–	0.4	0.1	–
Gas Releases & Fugitives	–	–	–	–	–	–	5.0
Total TPY	**3.9**	**3.9**	**3.9**	**22.6**	**50.1**	**78.5**	**19.7**

Pollutant	Tons/year
Single HAP	7.9
Total HAP	19.9

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
$PM_{2.5}$	15
SO_2	50
NO_x	50
CO	250

The total annual licensed emissions for the facility are above at least one of the emission levels contained in the table above; however, after taking into consideration the following factors:

- similarity with other licensed sources based on size, emissions, and local topography;
- location, including proximity to other sources, complex terrain and Class I areas; and
- background air quality data available in or representative of the local area,

The Department has determined that an ambient air quality impact analysis is not required for the facility and that Ambient Air Quality Standards (AAQS) will not be exceeded.

This determination is based on information provided by the applicant regarding the expected operation of the licensed emission units. If the Department determines that any parameter (e.g., stack size, configuration, flow rate, emission rates, nearby structures, etc.) deviates from what was included in the application, the Department may require Archaea to submit additional information and may require an ambient air quality impact analysis at that 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-1150-71-F-A subject to the conditions found in Air Emission License A-1150-71-A-N, and in amendments A-1150-71-B-M, A-1150-71-C-A, A-1150-71-D-A, and A-1150-71-E-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 shall replace Conditions (17)(E)(4) and (5) of Air Emission License A-1150-71-E-M:

(17) **Gas Processing, TO #1, and Flare #2**

E. Hydrogen Sulfide and Sulfur Dioxide Control [06-096 C.M.R. ch. 115, BACT]

4. At least annually with no more than 14 months between tests, Archaea shall test the gas exiting the carbon scrubbers three times during a single day using ASTM Test Method D5504, or other methods as approved by the Department, to analyze for H_2S and total sulfur.

5. Concurrent with the annual test, measurements of H_2S shall be taken with the handheld monitor or equivalent. If the results of the handheld (or equivalent) sampling do not correspond within reasonable accuracy to the annual test results, Archaea shall reassess/replace/recalibrate the handheld monitor, or equivalent, as appropriate to obtain valid sampling results. The annual test for H_2S shall be repeated to confirm the handheld monitor corresponds to within 5 ppm.

The following shall replace Condition (17)(H) of Air Emission License A-1150-71-E-M:

(17) **Gas Processing, TO #1, and Flare #2**

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

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
TO #1	0.09	0.09	0.09	3.24*	1.70	2.40	0.70
Flare #2	3.23	3.23	3.23	13.00*	13.06	59.52	0.63

*12-month rolling average basis

The following shall replace Condition (22)(B) of Air Emission Licenses A-1150-71-C-A and A-1150-71-D-A:

(22) **Annual Emission Statements**

B. Archaea shall keep the following records in order to comply with 06-096 C.M.R. ch. 137:

1. The amount of natural gas/propane and tail gas combusted in TO #1 on a monthly and calendar year basis;
2. The amount of natural gas/propane and off-spec gas combusted in Flare #2 on a monthly and calendar year basis;
3. The sulfur content of the tail gas combusted in TO #1 and the off-spec gas combusted in Flare #2 based on annual testing of TRS;
4. The amount of distillate fuel fired in each generator (Generators #1 - #9) on a monthly and calendar year basis;
5. The sulfur content of the distillate fuel fired in the generators;
6. The amount of natural gas fired in each compressor (Compressors #1 - #2) on a monthly and calendar year basis;
7. Calculations of the annual VOC, greenhouse gases (GHG), and HAP emissions from gas releases and fugitive emissions;
8. Hours each emission unit was active or operating on a monthly and calendar year basis; and
9. Any other record necessary to comply with the requirements of 06-096 C.M.R. ch. 137.

The following are new conditions:

(26) **SO_2 Emission Limit**

Combined annual emissions of SO_2 from TO #1 and Flare #2 shall not exceed 22.3 tpy on a 12-month rolling total basis. Compliance shall be demonstrated by annual testing of the tail gas exiting the control equipment (i.e., the carbon scrubber outlet) with no more than 14 months between tests and monthly records of the amount (scf) of gas sent to each unit. [06-096 C.M.R. ch. 115, BACT]

(27) If the Department determines that any parameter value pertaining to construction and operation of the emissions units, including but not limited to stack size, configuration, flow rate, emission rates, nearby structures, etc., deviates from what was submitted in the application or ambient air quality impact analysis for this air emission license, Archaea may be required to submit additional information. Upon written request from the Department, Archaea shall provide information necessary to demonstrate AAQS will not be exceeded, potentially including submission of an ambient air quality impact analysis or an application to amend this air emission license to resolve any deficiencies and ensure

compliance with AAQS. Submission of this information is due within 60 days of the Department's written request unless otherwise stated in the Department's letter. [06-096 C.M.R. ch. 115, § 2(O)]

DONE AND DATED IN AUGUSTA, MAINE THIS 12th DAY OF MARCH, 2025.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY:_____ for ____
MELANIE LOYZIM, COMMISSIONER

The term of this license amendment shall be ten (10) years from the issuance of Air Emission License A-1150-71-A-N (issued 2/24/2020).

[Note: If a renewal application, determined as complete by the Department, is submitted prior to expiration of this license, then pursuant to Title 5 M.R.S. § 10002, all terms and conditions of the license shall remain in effect until the Department takes final action on the license renewal application.]

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 1/23/2025
Date of application acceptance: 1/24/2025

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