COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southwest Regional Office

TO AQ Case File SOOP-63-01001

FROM Bradley D. Spayd /BDS
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THROUGH Thomas J. Joseph, P.E. /TJJ
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DATE October 22, 2024

Re: Review Memorandum of Natural Minor State-Only Operating Permit Application
ETC Northeast Pipeline, LLC
Revolution Cryogenic Plant
Smith Township
Washington County

APS 1090694 AUTH 1443667 PF 805136 (State-Only Operating Permit Application)

Background:

ETC Northeast Pipeline, LLC ("ETC") owns and operates the Revolution Cryogenic Plant ("Rev Cryo") located at 76 Rover Lane, Bulger, PA 15019 in Smith Township, Washington County (40.4140816, -80.3500418). The facility is a natural gas processing plant.

The permittee conducts non-FERC-regulated midstream natural gas gathering and processing business. Activities include constructing and operating non-FERC-regulated, intrastate gathering lines and compression facilities; transporting natural gas from well sites to natural gas processing facilities or interconnections with interstate natural gas transmission pipelines; constructing and operating natural gas processing facilities; transporting natural gas to interconnection points on interstate transmission pipelines; transporting natural gas liquids to interstate liquid pipelines.

The primary air contamination sources at the facility consist of a 200 MMscfd cryogenic processing unit, an amine treatment unit controlled by a thermal oxidizer, various heaters, a condensate stabilization unit, condensate storage tanks, condensate truck loading controlled by a combustor, a facility-wide flare, and miscellaneous storage tanks, piping, and components.

The Revolution Cryogenic plant is currently permitted under *General Plan Approval and/or General Operating Permit BAQ-GPA/GP5, Natural Gas Compression Stations, Processing Plants, and Transmission Stations,* permit GP5-63-01001A (also under AG5-63-00004A) and permitted under GP1-63-01001A (*Small Gas and No. 2 Oil-Fired Combustion Units*) for a boiler and a number of heaters, both of which were authorized for use on August 7, 2018. The plant was first authorized for construction, installation, and operation on August 3, 2016, under GP5-63-01001 and had expanded operations authorized in 2018 under GP5-63-01001A.

Under the expansion project permitted under GP5-63-01001A on August 7, 2018, the following equipment was authorized for installation and operation:

- One (1) new stabilizer.
- One (1) new 11.3 MMBtu/hr enclosed combustor to control rod packing emissions from both the existing and new stabilizer overhead reciprocating compressors.
- One (1) new 200 MMscfd amine sweetening unit with still vent controlled by a 5.54 MMBtu/hr thermal oxidizer and flash gas controlled by the new MSS plant flare.
- New natural gas fractionation process equipment
    - De-methanizer (Cryogenic Unit on process flow diagram)
    - De-ethanizer (NGL Frac on process flow diagram)
- New Storage tanks:
    - Two (2) 500-gallon horizontal methanol tanks
    - One (1) 16,800-gallon fixed roof water tank
    - One (1) 4,200-gallon fixed roof amine drain tank
    - One (1) 4,000-gallon fixed roof open drain tank
- One (1) new 906 MMBtu/hr Maintenance, Startup, Shutdown (MSS) Plant Flare
- Three (3) 5,000-bhp electric-driven residue gas reciprocating compressors
- Additional fugitive emissions from component leaks.

Concurrent with the 2018 expansion project, ETC proposed to install and operate the following heaters associated with the processing plant under GP1-63-01001A:

- Three (3) 40.92 MMBtu/hr Tulsa Heaters, Inc. natural gas-fired heat medium oil (HMO) heaters with fuel gas recirculation.

Although the facility is currently permitted under GP5-63-01001A and GP1-63-01001A, respectively, for the existing equipment on site, the new equipment listed above were never constructed, and the expansion project was abandoned at that time.

The following equipment was previously authorized under GP5-63-01001 on August 3, 2016, and was included under GP5-63-01001A:

- One (1) stabilizer
- One (1) 200 MMscfd amine sweetening unit with still vent controlled by a 5.54 MMBtu/hr thermal oxidizer
- Natural gas fractionation process equipment
    - De-methanizer
    - De-ethanizer
- Storage tanks
    - Two (2) 90,000-gallon 12-lb pressurized condensate tanks
    - Two (2) 21,000-gallon 2-lb fixed roof condensate tanks
    - Two (2) 500-gallon horizontal methanol tanks
    - Twenty-four (24) new/used compressor oil/liquids tanks (280 to 11,760-gallon capacities)
    - Two (2) 21,000-gallon fixed roof slop tank
    - One (1) 16,800-gallon R.O. fixed roof water tank
    - One (1) 8,820-gallon fixed roof amine tank
    - One (1) 4,200-gallon fixed roof amine drain tank
    - One (1) 5,000-gallon pressurized propane tank
    - One (1) 4,000-gallon fixed roof open drain tank
- One (1) 488 MMBtu/hr Maintenance, Startup, Shutdown (MSS) plant flare (currently rated up to 906 MMBtu/hr).
- One (1) 11.3 MMBtu/hr combustor for controlling truck loading.
- Three (3) 5,000 bhp electric-driven residue gas reciprocating compressors.

- Fugitive emissions from component leaks.

The following heaters previously authorized under GP1-63-01001 on August 3, 2016, were included under GP1-63-01001A:

- Three (3) 40.92 MMBtu/hr Tulsa Heaters, Inc. natural gas-fired heat medium oil (HMO) heaters with fuel gas recirculation.

The facility also includes the following sources which were determined to be exempt from plan approval requirements under 25 Pa. Code §127.14(d) listed as No. 39 in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8):

- Two (2) 6.22 MMBtu/hr natural gas-fired NGL dehydration regenerator heaters;
- Two (2) 8.5 MMBtu/hr natural gas-fired regenerator gas heater;
- The facility also includes the following pigging activities which were determined to be exempt from plan approval and operating permit requirements on August 3, 2016, as determined through a Request for Determination (RFD) under 25 Pa. Code §127.14(d) listed as No. 44 in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8).
    - One (1) 30" high pressure Bluestone to Rev Cryo pig receiver controlled by the enclosed plant flare.
    - One (1) 12" C_3+ (propane+) Rev Cryo to C_3+ Storage Facility pig launcher controlled by the enclosed plant flare.

Table I shows subsidiaries of ETC Northeast Pipeline, LLC that operate in Pennsylvania. Table II shows ETC-owned permitted facilities in Pennsylvania as of the date of application submittal.

Table I:
Subsidiaries with Operations in Pennsylvania of Parent Company Energy Transfer Partners, L.P. of Applicant ETC Northeast Pipeline, LLC

Entity Name	Entity Main Address	Jurisdiction	FEIN #	Relationship to Applicant
Regency Marcellus Gas Gathering LLC	101 West Third Street, 3rd Flr Williamsport, PA 17701	DE	27-2142725	Subsidiary of applicant
ETC Northeast Field Services, LLC	6051 Wallace Road, Ste 300 Wexford, PA 15090	DE	35-2497449	Subsidiary of applicant
ET Rover Pipeline LLC	1300 Main Street, Houston, TX 77002	DE	46-5655475	Indirect subsidiary of ultimate parent and Member, Rover Pipeline LLC joint venture
Rover Pipeline LLC	1300 Main Street, Houston, TX 77002	DE	47-1958303	Joint Venture of ET Rover Pipeline LLC and a non-affiliated company, AE-MidCo Rover, LLC
Energy Transfer Marketing & Terminals L.P.	8111 Westchester Drive, Dallas, TX 75225	TX	23-3102655	Indirect subsidiary of ultimate parent
Sunoco Pipeline L.P.	8111 Westchester Drive, Dallas, TX 75225	TX	23-3102656	Indirect subsidiary of ultimate parent
ETC Production LLC	8111 Westchester Drive, Dallas, TX 75225	DE	88-1911493	Indirect subsidiary of ultimate parent

Table II:

Names, Locations, and Permits for ETC Northeast Pipeline, LLC and Subsidiary Entities in Pennsylvania

Facility	Company Name	Location	Permit No.	Permit Issuance	Permit Expiration
AUBURN	Regency Marcellus Gas Gathering, LLC	Auburn Twp., Susquehanna Co.	AG5-58-00015A	11/12/2019	11/30/2024
BARTO	Regency NEPA Gas Gathering, LLC	Penn Twp., Lycoming Co.	GP5-41-02G	06/10/2022	06/10/2027
BRADFORD	Regency Marcellus Gas Gathering, LLC	West Burlington, Twp. Bradford Co.	GP5-05-04G	05/16/2023	05/16/2028
BOBST MOUNTAIN	Regency Marcellus Gas Gathering, LLC	Cogan House Twp. Lycoming Co.	GP5-41-651B	07/05/2018	07/05/2023
CANOE RUN	Regency Marcellus Gas Gathering, LLC	Mifflin Twp., Lycoming Co.	AG5-41-00001A	05/22/2023	05/22/2028
CHAPIN	Regency Marcellus Gas Gathering, LLC	Monroe Twp., Wyoming Co.	GP5-66-003A	01/31/2023	01/31/2028
HIRKEY	Regency Marcellus Gas Gathering, LLC	Washington Twp., Wyoming Co.	66-00010	07/08/2020	07/08/2025
LONE WALNUT	Regency Marcellus Gas Gathering, LLC	Cummings Twp. Lycoming Co.	AG5-41-00012A	07/23/2020	7/23/2025
MEHOOPANY	Regency Marcellus Gas Gathering, LLC	Washington Twp. Wyoming Co.	AG5-66-00003A	09/05/2018	09/05/2023
MILESKY	Regency Marcellus Gas Gathering, LLC	Center Twp., Green Co.	GP5-30-00216B	11/20/2019	11/20/2024
OGONTZ EAST	Regency Marcellus Gas Gathering, LLC	Cummings Twp. Lycoming Co.	AG5-41-00016A	08/16/2021	08/16/2026
OGONTZ WEST	Regency Marcellus Gas Gathering, LLC	Cummings Twp. Lycoming Co.	AG5-41-00015A	07/22/2021	07/22/2026
POORMAN	Regency Marcellus Gas Gathering, LLC	Gallagher Twp., Clinton Co.	AG5-18-00001A	09/06/2019	09/06/2024
QUAKER	Regency Marcellus Gas Gathering, LLC	Fairfield Twp., Lycoming Co.	AG5-41-00004A	08/20/2021	08/20/2026
RED BEND	Regency Marcellus Gas Gathering, LLC	Cogan House Twp. Lycoming Co.	GP5-41-700A	06/10/2022	06/10/2027
ROUPP	Regency Marcellus Gas Gathering, LLC	Mifflin Twp., Lycoming Co.	AGP-41-00018A	10/14/2021	10/14/2026
SEVERCOOL	Regency Marcellus Gas Gathering, LLC	Forkston Twp., Wyoming Co.	AG5-66-00001A	07/18/2018	07/18/2023
SUSQUEHANNA EAST	Regency Marcellus Gas Gathering, LLC	Lathrop Twp., Susquehanna Co.	GP5-58-005A	03/31/2023	03/31/2028
TAYLOR	Regency Marcellus Gas Gathering, LLC	Canton Twp., Bradford Co.	GP5-08-391A	01/10/2022	01/10/2027
TEEL	Regency Marcellus Gas Gathering, LLC	Springville Twp., Susquehanna Co.	GP5-58-002A	02/28/2023	02/28/2028
GALAXY	ETC Northeast Pipeline, LLC	Parker Twp., Butler Co.	AG5-10-00005A	12/01/2021	12/01/2026
REVOLUTION CRYO	ETC Northeast Pipeline, LLC	Smith Twp., Washington Co.	GP-1-63-01001A	08/07/2018	08/07/2023
			GP5-63-01001A	08/07/2018	08/07/2023
PIKE	ETC Northeast Field Services, LLC	New Sewickley Twp., Beaver Co.	04-00741A	11/05/2021	11/05/2026
FREEDOM	ETC Northeast Field Services, LLC	New Sewickley Twp., Beaver Co.	GP5-04-00744A	02/01/2023	02/01/2028

After a December 25, 2022 fire at the facility that resulted in a replacement amine sweetening unit, the Department requested that the facility be permitted under a state-only operating permit rather than under a general permit when the next general permit renewal application would have been due (August 8, 2023), since the most recent revision of the Department's GP-5 no longer allows for the operation of amine sweetening units.

On June 9, 2023, the Department received a state-only operating permit application for this facility prepared by Trinity Consultants on behalf of ETC Northeast Pipeline, LLC that is the subject of this review.

The most recent full compliance evaluation (FCE) inspection was conducted on November 28, 2023, by Pamela Trovato, former Air Quality Specialist. No violations were noted during the inspection. The most recent administrative inspection was conducted on January 22, 2024, also by Pamela Trovato. No violations were noted during the inspection.

Table III shows air contamination sources and air cleaning devices at the Revolution Cryogenic Plant processing plant.

Table III:
Emission Sources and Controls

Source ID	Description[6]		Capacity/Rating	Make & Model	Control I	Control II	SCC	Department Authorization	Date of Authorization
031	40.92 MMBtu/hr HMO Heater 1		40.92 MMBtu/hr; 355.3 MMscf/yr	Tulsa Heaters, Inc. (Zeeco Burners) with Vertical Cylindrical GSLF Free-Jet Segmented Ring Burners	---	---	10200602	GP1-63-01001/ GP1-63-01001A	08/03/2016/ 08/07/2018
032	40.92 MMBtu/hr HMO Heater 2		40.92 MMBtu/hr; 355.3 MMscf/yr	Tulsa Heaters, Inc. (Zeeco Burners) with Vertical Cylindrical GSLF Free-Jet Segmented Ring Burners	---	---		GP1-63-01001/ GP1-63-01001A	08/03/2016/ 08/07/2018
033	40.92 MMBtu/hr HMO Heater 3		40.92 MMBtu/hr; 355.3 MMscf/yr	Tulsa Heaters, Inc. (Zeeco Burners) with Vertical Cylindrical GSLF Free-Jet Segmented Ring Burners	---	---		GP1-63-01001/ GP1-63-01001A	08/03/2016/ 08/07/2018
201	200 MMscfd Amine Unit 1[5]		200 MMscfd	---	C201: 1.07 MMBtu/hr Amine Unit Thermal Oxidizer 1 for Still Vent (0.27 MMBtu/hr pilot)[2]	C202-1: 906 MMBtu/hr Rev Cryo 1 Plant Flare w/ 0.34 MMBtu/hr pilot[3]	31000404	GP5-63-01001	08/03/2016
204	Electric Compressor Rod Packing		1,985,454 scf/yr	---	C204: 11.3 MMBtu/hr Rod Packing Combustor	---	31000299	GP5-63-01001	08/03/2016
301	Tanks/Vessels	90,000-gallon Condensate Tanks (Each) TK-811A and TK-811B	90,000-gallon (each)	---	---	---	31000214	GP5-63-01001	08/03/2016
		21,000-gallon 2-lb RVP Condensate Tanks (Each)	21,000-gallon (each)	---	C702: Truck Loading Combustor: 1.0 MMBtu/hr (pilot rating), 0.086 MMBtu/hr (flare rating)[1]	---		GP5-63-01001	08/03/2016
		Miscellaneous Tanks	500-16,800-gallons each	---	---	---		GP5-63-01001/ GP5-63-01001A	08/03/2016/ 08/08/2018
401	Heaters	NGL Dehy Regen Heater (HTR-001)	6.22 MMBtu/hr; 54 MMscf/yr	---	---	---	10200602	GP5-63-01001	08/03/2016
		Regenerator Gas Heater (HTR-002)	8.5 MMBtu/hr; 73.8 MMscf/yr	---	---	---		GP5-63-01001	08/03/2016
		Fifteen (15) Catalytic Heaters	0.85 MMBtu/hr (Combined); 7.3 MMscf/yr (Combined)	---	---	---		GP5-63-01001	08/03/2016
501	Pneumatic Devices		13,164 scf/yr	---	---	---	31000299	GP5-63-01001	08/03/2016
601	Venting/Blowdowns[4]		98,719,919 scf/yr	---	---	C202-1: 906 MMBtu/hr Rev Cryo 1 Plant Flare	31000299	GP5-63-01001	08/03/2016
701	Fugitives		926,863 scf/yr pre-control/27,300 lbs gas leak rate/yr from fugitive emission components post-control;	---	---	---	31000220	GP5-63-01001	08/03/2016
702	Truck Loadout		1,308,994 bbl/yr truck unloading; 79,748 bbl/yr slop hauling	---	C702: Truck Loading Combustor: 1.0 MMBtu/hr (flare loading), 0.086 MMBtu/hr (pilot rating)[1]	---	31000299	GP5-63-01001	08/03/2016
801	Pigging Operations		1,460,000 scf/yr	---	---	C202-1: 906 MMBtu/hr Rev Cryo 1 Plant Flare	31000299	RFD-63-01001	08/08/2016
FLARE-001	MSS Flare (FLARE-001)		906 MMBtu/hr	---	---	---	30600904	GP5-63-01001	08/03/2016
COMB-001	Combustor for Tank & Loading (COMB-001)		1.0 MMBtu/hr	---	---	---	30600904	GP5-63-01001	08/03/2016
THERM-001	Thermal Oxidizer/Rod Packing Combustor (THERM-001)		11.3 MMBtu/hr	---	---	---	30600904	GP5-63-01001	08/03/2016

[1] 100% Capture Eff.; 99% DE of VOCs and HAPS (Manuf. Specs).
[2] 100% capture eff. 99% DE of VOCs and HAPs
[3] 98% DE of VOCs and HAPs (Manuf. Specs).
[4] 96% to Flare; 4% as Fugitive.
[5] About 73% of the amine unit total exhaust comprises of the regen vent going to the thermal oxidizer. The remaining 27% is flash gas routed to the MSS flare.
[6] The enclosed 11.3 MMBtu/hr rod packing combustor, the MSS flare, a second amine sweetening unit, and some miscellaneous storage tanks and associated fugitive emission components were authorized under GP5-63-01001A. The second amine sweetening unit and three (3) additional heaters authorized under GP5-63-01001 were never constructed.

Requests for Determinations and Miscellaneous:

RFD-63-01001: On the same date as GP5-63-01001 and GP1-63-01001 were authorized, August 3, 2016, the Department also determined that the pig launcher and receiver controlled by an enclosed flare were exempt from Plan Approval and Operating Permit requirements as determined through a Request for Determination (RFD) under 25 Pa. Code §127.14(d) listed as No. 44 in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8).

RFD-63-01001A: On June 14, 2018, the Department received an RFD application for truck loading of C_3+ product due to delays on the C_3+ pipeline. The company proposed to load C_3+ product by truck for up to 90 days while the pipeline was completed.

RFD-63-01001B: On July 13, 2022, the Department approved a request for determination (RFD) for the use of the amine unit flash gas as fuel or have it routed to the flare; the replacement of several exempt above ground oil tanks with double walled tanks; equipping the 2-lb RVP Condensate Tanks and the Amine Tank with gas blankets; routing the 2-lb RVP Condensate Tanks to the exiting truck loading combustor; and the use of a moisture analyzer on the mol sieve dehydration process. These changes were determined to be exempt from plan approval requirements per 25 Pa. Code §127.14(d) listed as No. 44 in the Department's *Air Quality Permit Exemptions* (275-2101-003, July 1, 2021) under 25 Pa. Code §127.14(a)(8).

It was the understanding of the Department that the mol sieve process includes three (3) columns where the gas feed is cycled through adsorption, regeneration, and cooling vessels; the mol sieve process itself is not vented; however, a moisture analyzer associated with the mol sieve tests a small slipstream of natural gas that is ultimately vented; the moisture analyzer vent is estimated to vent at a rate of 5 scfh; and that the combined impact of these changes were less than 2.7 tons of VOC, 1,000 lbs of any single HAP, nor 1.0 ton of total HAP in any consecutive 12-month period.

RFD-63-01001C (RFD 4471): On May 8, 2023, the Department determined that a project to repair an existing Amine Unit at the site at the ETC Northeast Pipeline, LLC facility located in Smith Township, Washington County did not qualify the Amine Unit as a new source and was exempt from plan approval requirements. This determination was made based on the list of sources qualifying for exemption in the Department's Published Notice of Plan Approval and Operating Permit Exemptions under 25 Pa. Code §127.14(a)(8) as established in accordance with §127.14(d) and the definition of a new source as listed under 25 Pa Code §121.1. Specifically, the project qualifies for plan approval exemption under item No. 44 - "Any source granted an exemption by the Department through the execution of an RFD form." It is the Department's understanding that the facility is currently permitted under GP5-63-01001A (aka AG5-63-0004A) and GP1-63-01001A both authorized for use on August 7, 2018, under the 2015 version of GP-5; that information provided by ETC in January and February 2023 was accurate and correct including, but not limited to, the fixed capital costs of new components associated with replacement and repairs of the existing Amine Unit were below fifty percent of the fixed capital cost that would be required to construct an entirely new Amine Unit; that neither potential nor actual air emissions at the facility would increase as a result of this project; and that the project will not trigger the requirements of 25 Pa. Code Chapter 127 Subchapters D and E (relating to prevention of significant deterioration of air quality and new source review).

Miscellaneous: Between September 10, 2024 and September 17, 2024, the facility had planned maintenance activity for flare tip replacement which was a physical change qualifying for exemption under 25 Pa. Code §127.14(a)(9). An RFD was not required for this activity. A temporary flare was on site during this time.

Testing and Reporting:

On March 29, 2022, the Department conditionally approved testing for NOx, CO, and O_2 emissions of the three (3) HMO heaters (Sources 031-033) for testing that occurred on April 25, 2022. Testing was conducted by Testing Compliance Solutions, LLC (TCS) using EPA Methods EPA Methods 1, 3A, 7E, 10 and 205 for compliance with GP1-63-01001A requirements. The GP-1 emission limits are 30 ppmdv at 3% O_2 and 300 ppmdv at 3% O_2 for CO. According to the Department's April 25, 2022 inspection report, "The test taking place was a retest for an original test conducted on 4/6-7/2021. ETC discovered that the stack testing company did not monitor the correct parameters and self-reported this issue to the Department. The stack test company was supposed to be monitoring fuel gas flow rate from the control room but instead was monitoring it from fuel meters located on the units. [Company Representative] informed me that the fuel meters on the units have been replaced and are operating as designed."

The Department's September 30, 2022, memorandum from the Department's Division of Source Testing noted the following: "The NOx/CO results are acceptable for determining compliance at, or below, the 3-hour average heat input (HI) achieved during testing. However, the results are not acceptable for determining compliance above the HI (3-hour average) achieved during testing (83-87% of the rated heat input). Since the maximum routine HI for each boiler was not provided, it is unclear if testing was conducted in accordance with 25 PA Code 139.11(1). If not, a restriction on the HI, or other actions by mutual agreement with regional staff, is recommended."

A December 17, 2021, review memorandum from the Department's Division of Source Testing described the following:

> *On April 6 - 7, 2021, Alliance Source Testing, LLC conducted a baseline test to determine the (1) combustion gas net heating value (EPA Method Alt-100), exit velocity (EPA Method 2D), and fugitive emissions (FE; EPA Method 22) from a 488 MMBtu/hour Rev Cryo 1 Plant Flare, used to control the emissions from the Revolution Cryo Plant maintenance, startup, and shutdown operations; and (2) nitrogen oxides (NOx; EPA Method 7E) and carbon monoxide (CO; EPA Method 10) emissions from 40.92 MMBtu/hour HMO Heaters (Source IDs: 031 – 033).*

The memorandum noted that the results were acceptable to the Department.

On April 11, 2019, the Department of Environmental Protection (DEP) received a pre-test protocol for the baseline testing to determine the (1) combustion gas net heating value, exit velocity, and visible emissions (VE) from a 488 MMBtu/hour Rev Cryo 1 Plant Flare (Source ID: C202), used to control the emissions from the ETC Northeast Pipeline/Revolution Cryo Plant maintenance, startup, and shutdown operations; and (2) nitrogen oxides (NO_x) and carbon monoxide (CO) emissions from 40.92 MMBtu/hour HMO Heaters 1 – 3 (Source IDs: 031 – 033). The protocol was acceptable to the Department.

Additional testing records and reports can be found in the Department's PSIMS system or paper records.

Reporting, Compliance History, and Violations:

The following air quality notice of violations were included in the compliance review form in the application subject to this review, with the most recent action in July 2024 being added.

Table IV:
Compliance Review Summary

Date	Plan Approval/Operating Permit No.	Nature of Documented Conduct	Type of Department Action	Status: Litigation Existing/Continuing or Corrected/Date
07/2024	AG5-63- 01001A	Visible emissions exceedance from flare/Heater test not conducted in accordance with GP-1	CACP	Corrected
07/28/22	AG5-63- 01001A	Visible emissions exceedance from flare	NOV	Corrected
07/07/22	AG5-63-01001A	Visible emissions exceedance from flare	NOV	Corrected
02/03/22	AG5-63-01001A	Visible emissions exceedance from flare	NOV	Corrected
01/10/22	AG5-63-01001A	Heater emission test not conducted at adequate operating load	NOV	Corrective action schedule submitted to DEP
11/12/21	AG5-63-01001A	Visible emissions exceedances from flare	CACP	Corrected, CACP for multiple NOVs.
10/12/21	AG5-63-01001A	Visible emissions exceedance from flare	NOV	Corrected
03/15/21	AG5-63- 01001A	Visible emissions and opacity exceedance from flare	NOV	Corrected
03/10/21	AG5-63- 01001A	Visible emissions exceedance from flare	NOV	Corrected
01/25/21	AG5-63- 01001A	Visible emissions exceedance from flare	NOV	Corrected
01/15/21	AG5-63- 01001A	Visible emissions exceedance from flare	NOV	Corrected
11/17/20	AG5-63- 01001A	Failure to conduct Method 22 observation	NOV	Corrected

Recent Shutdown, Deviation, or Malfunction Events:

Recent deviation events from 2024 are described below. Other deviations, malfunction reports, or emergency shutdown events prior to 2024 are available in Departmental records.

On June 27, 2024, the Department was notified by ETC that at approximately 8:35 p.m. on the day prior, an upset condition with the de-ethanizer unit at Rev Cryo caused a flaring event that lasted until approximately 11:34 p.m.

On September 10, 2024, a power loss to the flare blower caused visible emissions to occur from the main plant flare for approximately 10 minutes. Power was restored via a generator to bring the blower back into service. Method 22 observations were subsequently performed.

Also occurring on September 10, 2024, a temporary flare was placed into service while the main plant flare was out of service for maintenance and replacement of the flare tip. Visible emissions occurred during the operation of the temporary flare until it was brought out of service at approximately 4:15 pm on September 13, 2024 when the main plant flare was placed back into service. Method 9 observations of the flare were conducted on September 11th and 12th, and the opacity readings ranged from 5-15%.

On September 14, 2024, starting in the morning, intermittent low-opacity visible emissions were observed coming from the main plant flare. These intermittent visible emission events occurred from September 14, 2024 to September 17, 2024. ETC reported the visible emissions to the Department on September 16, 2024 via phone. ETC continued tuning and troubleshooting and engaged the flare manufacturer to adjust settings for a newly installed flare tip. ETC notified the Department of this change, and it was to reduce the potential for visible emissions at low BTU, high flow rates. However, once the flare tip was changed, visible emissions have been observed for high BTU, low flow rates. ETC is continuing to work with the flare manufacturer on this issue. On September 23, 2024, at approximately 1:10 p.m., visible emissions were observed coming from the flare at until 1:30 p.m. This occurred during the blowdown of the refrigeration compressors. Method 22 observations were subsequently performed. The Department conducted a site visit on October 2, 2024. The Department was notified on October 4, 2024, about another visible emission observation event.

Single Source Determination:

Stationary sources should be evaluated for aggregation to determine major source status with respect to New Source Review (NSR) and Title V (major source) permitting. Aggregation based on the EPA's definition of "stationary source" and "building, structure, facility, or installation," as defined in 40 CFR §52.21(b)(5) and (6) [81 FR 35622, dated June 3, 2016] which stated to be considered a single source, the following three criteria must be met:

- Criterion 1: The pollutant-emitting activities must belong to the same industrial grouping, meaning that they have the same first two digits of the Standard Industrial Classification (SIC). For onshore activities, the SIC Major Group is 13 – *Oil and Gas Extraction*.
- Criterion 2: The pollutant-emitting activities must be under common control.
- Criterion 3: The pollutant-emitting activities must be located on one or more contiguous or adjacent properties. The EPA considers pollutant-emitting activities for onshore activities, under SIC Major Group 13, as adjacent if they are located on the same surface site or located on one or more surface sites that are located within one quarter (¼) of a mile of one another, as measured from the center of the equipment on the surface site, and share equipment. "Surface site," as defined in 40 CFR §63.761, means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

However, per the 25 Pa. Code §121.1 definition of a *facility*, which the AQ Program follows, only two criteria must be met for a source that is not subject to Prevention of Significant Deterioration requirements:

- Criterion 1: The pollutant-emitting activities must be under common control.
- Criterion 2: The pollutant-emitting activities must be located on one or more contiguous or adjacent properties. The EPA considers pollutant-emitting activities for onshore activities, under SIC Major Group 13, as adjacent if they are located on the same surface site or located on one or more surface sites that are located within one quarter (¼) of a mile of one another, as measured from the center of the equipment on the surface site, and share equipment. "Surface site," as defined in 40 CFR §63.761, means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

The air contamination sources at the Rev Cryo Plant are owned and operated by ETC Northeast Pipeline, LLC, thereby satisfying Criteria 1 above. For Criterion 2, there are no ETC-owned or operated emissions sources within one quarter (¼) of a mile of the site, satisfying Criterion 2. Consequently, there are no other stationary air contamination sources to be aggregated with this facility for the purposes of permitting.

Regulatory Analysis:

Any facility authorized to operate under a GP-5 or a state-only operating permit must be operated in such a manner as to not cause air pollution as defined in 25 Pa. Code §121.1, operated and maintained in a manner consistent with good operating and maintenance practices, operated and maintained in accordance with the manufacturer's specifications, and the specifications and applicable terms and conditions of the GP-5 or state-only operating permit. Furthermore, nothing in the proposed state-only operating permit or currently authorized GP-5 relieves the owner or operator from the obligation to comply with all applicable Federal, State, and local laws and regulations, which may include New Source Performance Standards (NSPS) in 40 CFR Part 60 (incorporated by reference in 25 Pa. Code §122.3) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) codified under 40 CFR Parts 61 and 63 (incorporated by reference in 25 Pa. Code §124.3 and §127.35, respectively).

Best available technology is defined in 25 Pa. Code §121.1 as the "equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available." Best available technology applies at the time of authorization to construct, install, and temporarily operate air contamination sources via a plan approval or a general operating permit and can include various control technologies such as implementation of oxidation catalysts, control by an enclosed flare, emission limitations, or work practice standards, among others. A best available technology evaluation is outside the scope of this review because no new sources or modifications are being proposed in this application, and such a change may require a plan approval application to authorize the construction, installation, and temporary operation of such sources.

25 Pa. Code §135.3 requires annual AES emission reports if requested by the Department. The 2013 version of the Department's GP-5 and subsequent revisions included §135.3, and the Department requires all oil and gas facilities to report. The permittee has historically and continues to track actual emissions from the facility on a monthly and on a 12-month rolling basis, with annual AES emission inventory reports being submitted by March 1st of each year, unless an extension has been granted by the Department in writing. The facility first started reporting in 2018 for the 2017 reporting year. The facility will be required to continue submitting these annual AES emission reports for all air contamination sources at this facility.

The report must include all emissions information for all previously reported sources and new sources which were first operated during the preceding calendar year. Emissions data including, but not limited to the following, shall be reported: carbon monoxide - oxides of nitrogen (NOx) -particulate matter less than 10 micrometers in diameter (PM-10), particulate matter less than 2.5 micrometers in diameter (PM-2.5), sulfur dioxide, volatile organic compounds, total hazardous air pollutants (HAP), speciated individual HAP emissions, and greenhouse gases, expressed as CO_2e.

The requirements of 25 Pa. Code §135.3 and associated recordkeeping requirements of §135.5 will be included in the facility-wide requirements of Section C of the proposed state-only operating permit.

Per 25 Pa. Code §127.441, a facility-wide inspection shall be conducted at a minimum of once per day when the Facility is visited by the Owner/Operator. The facility-wide inspection shall be conducted for the presence of the following:

a. Visible stack emissions;
b. Fugitive emissions; and
c. Potentially objectionable odors at the property line.

These observations are to ensure continued compliance with source-specific visible emission limitations, fugitive emissions prohibited under 25 Pa. Code §123.1 or §123.2, and potentially objectionable odors

prohibited under 25 Pa. Code §123.31. Observations for visible stack emissions shall be conducted during daylight hours and all observations shall be conducted while sources are in operation. If any visible stack emissions, fugitive emissions, or potentially objectionable odors are apparent, the Owner/Operator shall take corrective action.

Previous versions of the GP-5 included visible emission limitations, prohibited potentially objectionable odors in accordance with 25 Pa. Code §123.31, and prohibited fugitive emissions in accordance with §123.1 and §123.2. Proposed requirements in this state-only operating permit will be at least as stringent as those in the currently authorized GP-5.

25 Pa. Code §129.14 specifies requirements related to open burning. The facility is not located in an air basin and is therefore subject to the limited open burning requirements of §129.14(b).

Per 25 Pa. Code §127.441, record keeping requirements at this facility will include monthly hours of operation for each air contamination sources and air cleaning device, monthly fuel consumption for each air contamination sources and air cleaning device, annual throughput for the condensate storage tanks, facility-wide inspections for visible stack, fugitive, and potentially objectionable odors, records of maintenance performed, and tracking actual emissions of criteria pollutants, certain HAPs, and greenhouse gases (GHGs) on a monthly and 12-month rolling basis, among others.

For malfunction reporting, ETC is required to notify the Department by telephone within twenty-four (24) hours of the discovery of any malfunction at the Rev Cryo plant or any malfunction of an associated air cleaning device that results in, or may possibly result in, the emission of air contaminants in excess of any applicable limitation or that otherwise results in noncompliance with the requirements of the currently authorized GP-5, GP-1, or the proposed state-only operating permit, if authorized by the Department.

Applicable GP-1 Requirements to the Small Gas & No. 2 Oil Fired Combustion Units

The applicant has three (3) previously installed 40.92 MMBtu/hr natural gas-fired heaters. The term “heater” is somewhat of a misnomer in this context, as heaters heat by direct heat transfer, whereas the three (3) HMO heaters at this facility meet the definition of a combustion unit/boiler since they heat by indirect heat transfer. The applicable requirements of the GP-1, described below, will be included in the proposed state-only operating permit for this facility.

Per GP-1 Condition 4, “… The combustion unit and any associated air cleaning devices shall be:

a. Operated in such a manner as not to cause air pollution.
b. Operated and maintained in a manner consistent with good operating and maintenance practices.
c. Operated and maintained in accordance with the manufacturer's specifications and the applicable terms and conditions of this Small Combustion Unit General Permit.”

Per GP-1 Condition 7, no later than one hundred and eighty (180) days after initial start-up, the permittee shall demonstrate compliance with the following emission limitations for NOx and CO established in Condition 17:

Table V:
GP-1 Emission Limits

Pollutant	GP-1 Emission Limitations	Applicable Emission Limitations Established Under GP1-63-01001A
	ppmdv@3%O_2	ppmdv@3%O_2
NOx	30	30
CO	300	49

*Emission rates based upon the manufacturer guarantee.

The applicant proposed to demonstrate compliance with the emission limitations by either stack testing or Department approved portable analyzer within 180 days of initial startup, in accordance with GP-1 Condition 7. As noted, stack testing occurred on April 25, 2022, and the results were deemed acceptable to the Department per a Division of Source Testing review memorandum dated September 30, 2022.

Per GP-1 Condition 16.a. "The permittee shall install and maintain the necessary meter(s) to determine and to record amount of fuel usage." The facility has meters to track and record the fuel consumption from these units.

25 Pa. Code §§ 123.1, 123.2, and 123.31 - Prohibition of certain fugitive emissions, fugitive particulate matter, and odor emission limitations apply to the heaters, though these requirements apply to all air contamination sources and air cleaning devices at the facility and will therefore be included under the site-wide requirements of Section C in the proposed operating permit.

Per 25 Pa. Code §123.11(a)(1), particulate matter emissions shall not exceed 0.4 lbs/MMBtu of heat input, when the heat input to the combustion unit in millions of Btus per hour is greater than 2.5 but less than 50. Consequently, the three 40.92 MMBtu/hr heaters would be limited to 16.37 lb/hr. However, based on the manufacturer's guaranteed emission rate, the proposed particulate matter emission rate (both as total PM, PM-10, and PM-2.5) will be 0.014 lbs PM-10/MMBtu, equating to 0.57 lbs/hr and 2.51 TPY PM-10, and assuming PM-10 is equal to PM-2.5, this also equates to 0.57 lbs/hr and 2.51 TPY PM-2.5.

Per 25 Pa. Code §123.22(d), SO_2 emissions shall not exceed one (1) lb SO_2/MMBtu of heat input, when the heat input to the combustion unit in millions of Btus per hour is greater than 2.5 but less than 50. The 40.92 MMBtu/hr heaters are consequently limited to 40.92 lbs SOx/hr by regulation. Based on AP-42 emission factors, the proposed SO_2 emission rate is 0.02 lbs/hr and 0.11 TPY SO_2.

Per 25 Pa. Code §123.41 person may not permit the emission into the outdoor atmosphere of visible air contaminants in such a manner that the opacity of the emission is equal to or greater than 20% for a period or periods aggregating more than 3 minutes in any hour; or equal to or greater than 60% at any time. This regulation applies to all air contamination sources and air cleaning devices at this facility unless more stringent visible emission or opacity requirements have been established as BAT. This regulation will be included in Section C of the proposed operating permit.

NSPS from 40 CFR 60 Subpart Dc-Standards of performance for small industrial-Commercial-Institutional Steam Generating Units applies to the "steam generating units" at this facility. Per 40 CFR §60.40c(a), this subpart applies to each steam generating unit for which construction... commenced after June 9, 1989 and that has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. Per 40 CFR §60.41c, *"steam generating unit"* means a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium..." The HMO heaters have a capacity of 40.92 MMBtu/hr, meet the definition of a steam generating unit, and were constructed after June 9, 1989; therefore, this subpart applies.

The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include the design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

The owner or operator shall comply with the recordkeeping and certification requirements in accordance with 40 CFR §§60.46c(e), 60.42c(h) and 60.48c(f)(l) (i.e. the permittee may use the fuel supplier certification to demonstrate compliance). The owner or operator shall maintain daily fuel consumption records in accordance with 40 CFR §60.48c(g).

NESHAPS for Industrial, Commercial, and Institutional Boilers Area Sources from 40 CFR Part 63 Subpart DDDDD does not apply to the 40.92 MMBtu/hr heaters (that meet the definition of a boiler since they heat by indirect heat transfer) at this facility. Per 40 CFR §63.7485, you are subject to this subpart if you own or operate a boiler at a major source of HAP. The facility is an area source of HAP; therefore, this subpart does not apply.

NESHAPS for Industrial, Commercial, and Institutional Boilers Area Sources from 40 CFR Part 63 Subpart JJJJJJ does not apply to the three (3) 40.92 MMBtu/hr HMO heaters (that meet the definition of a boiler since they heat by indirect heat transfer). In accordance with 40 CFR §63.11195(e), a gas-fired boiler as defined in this subpart is not subject to this subpart. *Gas-fired boiler* includes any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year. If the proposed boiler only combusts natural gas in accordance with the above definition, this subpart does not apply. The HMO heaters (i.e. boilers) will combust natural gas only, therefore this subpart does not apply.

General Permit BAQ-GPA/GP-5: Natural Gas Compression and/or Processing Facilities

Outside of the three (3) previously installed 40.92 MMBtu/hr natural gas-fired heaters that meet the definition of a combustion unit permitted under the GP-1, all other air contamination sources and air cleaning devices at this facility are currently permitted under a GP-5. The applicable requirements of the GP-5, described below, will be included in the proposed state-only operating permit for this facility.

Some general requirements from the GP-5 that will be retained for the state-only operating permit are for the owner or operator of the facility to keep records to verify compliance with facility-wide emission limitations and to maintain monthly and 12-month rolling sums of actual emissions. All required records at the facility shall be retained for a minimum of five (5) years and shall be made available to the Department upon request unless otherwise specified in the operating permit or by law. The Department reserves the right to request additional information necessary to determine compliance with the state-only operating permit.

Section B. Natural Gas-Fired Spark Ignition Internal Combustion Engines

GP-5 Section B - Requirements for Natural Gas-Fired Spark Ignition Internal Combustion Engines - There are no applicable requirements under this section since there are no natural gas-fired engines at this facility. All reciprocating compressors are electrically-driven with power supplied from the grid and therefore do not meet the definition of an internal combustion engine. As such, the new source performance standards under 40 CFR Part 60 Subpart JJJJ do not apply. Similarly, the requirements of 40 CFR Part 60 Subparts ZZZZ and IIII also do not apply.

Section C. Natural Gas-Fired Simple Cycle Gas Turbines

GP-5 Section C - Requirements for Natural Gas-Fired Simple Cycle Gas Turbines - There are no applicable requirements under this section since there are no natural gas-fired turbines at this facility. As such, NSPS 40 CFR Part 60 Subpart KKKK does not apply.

Section D. Natural Gas Compressors

GP-5 Section D-Requirements for Natural Gas Compressors -The owner or operator of natural gas compressors shall comply with the applicable requirements specified in 40 CFR Part 60, Subpart OOOO. Since the issuance date of the Department's GP-5 on January 16, 2015, EPA promulgated NSPS Subpart OOOOa, which the reciprocating compressors at this facility are subject to.

NSPS from 40 CFR Part 60 Subpart OOOO-Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after August 23, 2011, and on or before September 18, 2015 will not apply to the compressors since they were constructed after September 18, 2015.

NSPS from 40 CFR Part 60 Subpart OOOOa--Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 applies to the previously authorized reciprocating compressors. Per 40 CFR §60.5365a(c), each reciprocating compressor which commences construction after September 18, 2015, is considered an affected facility.

Per 40 CFR §60.5385a(a), the compressor rod packing is required to be replaced according to either paragraph (a)(l) or (2) of this section, or comply with paragraph (a)(3) of this section, as detailed below:

(1) On or before the compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning upon initial startup of your reciprocating compressor affected facility, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.

(2) Prior to 36 months from the date of the most recent rod packing replacement, or 36 months from the date of startup for a new reciprocating compressor for which the rod packing has not yet been replaced.

(3) Collect the methane and VOC emissions from the rod packing using a rod packing emissions collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of §60.541 la(a) and (d).

Per 40 CFR §60.5370a(a), ETC is required to be in compliance with the standards of this subpart upon startup. ETC uses an 11.3 MMBtu/hr rod packing combustor to comply with this section of this subpart.

GP-5 Section E - Requirements For Storage Vessels/Storage Tanks - The owner or operator of each storage vessel/storage tank shall also comply with the applicable requirements specified in 40 CFR Part 60, Subparts Kb and OOOO and 40 CFR Part 63, Subpart HH.

40 CFR Part 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, does not apply to the storage tanks at this facility. Although the storage tanks were constructed after the applicability date of July 23, 1984, per 40 CFR §60.440b(d)(4), "This subpart does not apply to… vessels with a design capacity less than or equal to 1,589.874 cubic meters (m^3) [10,000-bbl] used for petroleum or condensate stored, processed, or treated before custody transfer." The largest storage

tanks at this facility are the condensate tanks which are 90,000 gallons (approximately 341 m^3) each, and therefore below the applicability threshold of this subpart.

The applicable section of NSPS Subpart OOOO does not apply to the storage vessels at this facility since they commenced construction after September 18, 2015. Furthermore, the VOC emissions from each storage vessel are less than the applicability threshold of 6.0 TPY VOC per 40 CFR §60.5365(e).

Although constructed after September 18, 2015, the applicable section of 40 CFR Part 60 Subpart OOOOa will not apply to the storage vessels since the VOC emissions are less than 6 TPY. Per 40 CFR §60.5365a(e), each storage vessel affected facility is a single storage vessel with the potential for VOC emissions equal to or greater than 6 TPY. The VOC emissions from each storage vessel are less than 6 TPY; therefore, this subpart does not apply.

NESHAPS from 40 CFR Part 63 Subpart HH - Oil and Natural Gas Production Facilities does not apply to the storage tanks at this facility. Per 40 CFR 670(b)(2), for area sources, this subpart only applies to the owners and operators of TEG dehydration units and does not apply to storage vessels. There are no TEG dehydration units on site.

GP-5 Section E Condition 2 In accordance with 25 Pa. Code §127.l and §127.12(a)(5), the owner or operator of each storage tank with a capacity greater than 40,000 gallons shall also comply with the requirements in 25 Pa. Code §129.56. In accordance with 25 Pa. Code §129.56(a), no person may permit the placing, storing or holding in a stationary tank, reservoir or other container with a capacity greater than 40,000 gallons of volatile organic compounds with a vapor pressure greater than 1.5 psia unless the tank, reservoir or other container is a pressure tank capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere or is designed and equipped with: (1) an external or an internal floating roof; or (2) vapor recovery system. The two (2) previously authorized 12-lb condensate tanks are greater than 40,000 gallons and therefore are subject to §129.56. The two (2) 12-lb condensate tanks *satisfy the requirements of this section since they are capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere*. In the event of a malfunction or emergency, potential vapors from the PSV on the tanks will be routed to the plant flare.

25 Pa. Code §129.57 applies to storage tanks between 2,000 and 40,000 gallons with a vapor pressure equal to or greater than 1.5 psia. Storage tanks covered under this section shall have pressure relief valves which are maintained in good operating condition and shall be set to release at no less than 0.7 psig of pressure or 0.3 psig of vacuum or the highest possible pressure and vacuum.

According to the applicant the miscellaneous tanks at this facility with a capacity less than or equal to 40,000 gallons will have vapor pressure less than 1.5 psia, therefore this section does not apply. This section does not apply to the methanol tank since the capacity is less than 2,000 gallons.

Section F. Glycol Dehydrators

GP-5 Section F - Requirements for Glycol Dehydrators - There are no applicable requirements under this section since there are no glycol dehydrators at this facility. As such, 40 CFR Part 63 Subpart HH does not apply.

Section G and H. Processing Plants and Equipment Leaks

GP-5 Section G - Requirements for Onshore Natural Gas Processing Plants applies to this facility because it meets the definition of a natural gas processing plant since it engages in the extraction of natural gas liquids from field gas. In accordance with 25 Pa. Code §127.11 and §127.12(a)(5), the owner or operator of a

fractionation unit located at an onshore natural gas processing plant shall comply with 40 CFR Part 60, Subpart KKK- Standards of Performance for Equipment Leaks of VOCs from Onshore Natural Gas Processing Plants. The owner or operator shall also comply with the applicable requirements specified in 40 CFR Part 60, Subpart OOOOa which became effective on August 2, 2016.

NSPS from 40 CFR Part 60, Subpart KKK-Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011 does not apply to the processing plant since it was constructed after August 23, 2011.

Per 40 CFR §60.630(a):

(1) The provisions of this subpart apply to affected facilities in onshore natural gas processing plants.
(2) A compressor in VOC service or in wet gas service is an affected facility.
(3) The group of all equipment except compressors (defined in §60.631) within a process unit is an affected facility.

Natural gas processing plant (gas plant) is defined under 40 CFR §60.631 as any processing site engaged in the extraction of natural gas liquids (NGLs; defined as hydrocarbons, such as ethane, propane, butane, and pentane) from field gas, fractionation of mixed natural gas liquids to natural gas products, or both. According to the background document for Subpart KKK, extraction implies application of a forced process (e.g. refrigeration) to the gas to remove NGLs, and was intended to *exclude* passive separation of NGLs from field gas due to temperature or pressure changes as the gas is transported from the underground reserve to the surface, or temperature or pressure changes as the gas passes through a process vessel located at the surface.

In wet gas service is defined under 40 CFR §60.631 as a piece of equipment containing or contacting field gas before the extraction step in the process (which would imply that natural gas liquids extraction equipment is incorporated at the same facility).

Process unit is defined under 40 CFR §60.631 as equipment assembled for the extraction of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products.

The facility does engage in natural gas processing and meets the definition of a natural gas processing plant, however, since it was constructed after the applicability date of August 23, 2011, this subpart does not apply.

40 CFR Part 60, Subpart LLL – Standards of Performance for SO_2 Emissions from Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984 and on or Before August 23, 2011 does not apply to this facility for the same reason as above for Subpart KKK, since the natural gas processing plant was constructed after August 23, 2011.

NSPS from 40 CFR Part 60 Subpart OOOO - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after August 23, 2011, and on or before September 18, 2015 does not apply since the plant was constructed after September 18, 2015.

40 CFR Part 60 Subpart OOOOa – Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 applies to an affected facility listed in paragraphs (a) through (j) of 40 CFR §60.5365a that were constructed, modified, or reconstructed after September 18, 2015. Per 40 CFR §60.5365a(f), the group of all equipment within a process unit is considered an affected facility. Per 40 CFR §60.5430a, "*Process unit* means components assembled for

the extraction of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products..."

Rev Cryo includes equipment to extract natural gas liquids from field gas (separators and fractionation equipment), therefore the site is considered a *gas processing plant* subject to the leak detection and repair (LDAR) requirements of this subpart.

ETC is required to monitor and repair all fugitive emission components. NSPS Subpart OOOOa adopts several of the provisions from NSPS Subpart VVa with additional exemptions and requirements. Subpart VVa establishes leak definitions and monitoring frequencies for equipment, monitoring procedures in accordance with Method 21 or sensory monitoring, repair requirements for leaking equipment, and resurvey of equipment to ensure successful repair. Associated recordkeeping and reporting using EPA's Compliance and Emissions Data Reporting Interface also applies.

Per 40 CFR 60.5365a(g)(3), sweetening units located at a natural gas processing plant that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H_2S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423a(c) but are not required to comply with the control requirements of §60.5405a through §60.5407a and §60.5410a(g) and §60.5415a(g) of this subpart. The amine unit at this facility removes CO_2 from the gas, not H_2S. H_2S emissions are dependent upon the sulfur content of the gas. There is no sulfur in the gas and therefore no associated H_2S emissions are expected. In accordance with §60.5423a(c), "To certify that a facility is exempt from the control requirements of these standards, for each facility with a design capacity less than 2 LT/D of H_2S in the acid gas (expressed as sulfur) you must keep, for the life of the facility, an analysis demonstrating that the facility's design capacity is less than 2 LT/D of H_2S expressed as sulfur." ETC keeps such records onsite.

The requirements of **40 CFR Part 60 Subpart OOOOb—** ***Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After December 6, 2022,*** will not apply since no Subpart OOOOb-affected facilities will have commenced construction, modification, or reconstruction after December 6, 2022.

The requirements of **40 CFR Part 60 Subpart OOOOc—*Emissions Guidelines for Greenhouse Gas Emissions from Existing Crude Oil and Natural Gas Facilities*** (whether the "model rule" portion of Subpart OOOOc in §§60.5385c—60.5430c or State standards established pursuant to §§60.5360c—60.5481c of Subpart OOOOc) will apply to designated facilities of which construction, modification, or reconstruction commenced on or before December 6, 2022, and no later than 36 months after publication of the notice of final rulemaking for Subpart OOOOc in the *Federal Register*, which occurred on March 8, 2024 (March 8, 2027). Per §60.5386c, Subpart OOOOc-designated facilities include each *well*, *centrifugal compressor*, *reciprocating compressor*, *process controller*, *pump*, and *storage vessel, process unit, and fugitive emission component* as these terms are defined in 40 CFR §60.5430c. The specific applicable requirements will be determined after the Department's submittal of its plan to implement the emission guidelines of Subpart OOOOc.

GP-5 Section H - Requirements for Equipment Leaks - In addition to the requirements of NSPS Subpart OOOOa, ETC is required to meet the requirements of Section H of the GP-5, which will be carried over into the proposed state-only operating permit. Requirements include monthly audible, visual, and olfactory (AVO) inspections as well as initial (within 180 days after initial startup) and subsequent quarterly leak detection (LDAR) using a monitoring device approved by the Department for the detection of fugitive leaks.

According to the response to questions 4 and 5 of Department's FAQ- Implementation of GP-5 and Exemption No. 383, "DEP considers a "leak" as any release of gaseous hydrocarbons that is determined by Audible, Visual, and Olfactory ("AVO") inspection, which is required to be performed on a monthly basis by the GP-5. DEP also considers a "leak" as any release of gaseous hydrocarbons that will be detected by a Forward Looking

Infrared (FLIR) camera or any gas leak detection device, which is required to be used on a quarterly basis under GP-5.

However, any equipment or component that is designed to protect the equipment or safety of personnel is not considered a "leak". A release from any equipment or component designed by the manufacturer to protect the equipment, controller, personnel, to prevent ground water contamination, gas migration, or an emergency is also not considered a leak.

The owner or operator may use any gas detection device approved by the Department to detect leaks. Condition H.2 in the GP-5 authorizes the use of any technology for leak detection as an alternate to FLIR provided it is approved by DEP following a case-by-case evaluation of the device or technology."

If any leak is detected, ETC shall repair the leak as expeditiously as practicable, but no later than fifteen (15) days after the leak is detected, except as provided in 40 CFR § 60.482-9. ETC shall record each leak detected and the associated repair activity. These records shall be retained for a minimum of five (5) years and shall be made available to the Department upon request.

Section I. Pneumatic Controllers

GP-5 Section I - Requirements for Pneumatic Controllers - The owner or operator of each pneumatic controller affected facility shall also comply with the applicable requirements specified in 40 CFR Part 60, Subpart OOOOa. According to the applicant, the facility has two (2) Inboard Stroke intermittent-bleed pneumatic controllers with a Bettis/G5020 double acting actuator that are air-actuated.

Per the 2018 GP-5, Section I, (a) For each natural gas-driven pneumatic diaphragm pump constructed and authorized to operate on or after September 18, 2015, but prior to August 8, 2018, the owner and operator shall meet the applicable requirements of 40 CFR §60.5365a(h)(1) and §60.5393a(a) and (c) through (e). 40 CFR §60.5365a(h)(1) defines a *pneumatic pump affected facility* as "a single natural gas-driven diaphragm pump." In accordance with §60.5365, each pneumatic pump affected facility at a natural gas processing plant must have a natural gas emission rate of zero, and if a control device is used, the system must be a closed-vent system. Since the two intermittent-bleed pneumatic devices are air-actuated, they are meeting this requirement.

(b) For each natural gas-driven pneumatic pump constructed and authorized to operate on or after August 8, 2018, the owner or operator of a pump with:

(i) A methane emission rate of less than 200 tpy, a VOC emission rate of less than 2.7 tpy, a single HAP emission rate less than 0.5 tpy, and a total HAP emission rate less than 1.0 tpy, shall meet the applicable requirements of 40 CFR §60.5365a(h)(1) and §60.5393a(a) and (c) through (e).

(ii) A methane emission rate of 200 tpy or greater, a VOC emission rate of 2.7 tpy or greater, a single HAP emission rate of 0.5 tpy or greater, or a total HAP emission rate of 1.0 tpy or greater, shall route all vapor through a closed vent system to a control device that reduces methane, VOC, and HAP emissions by 95% or more by meeting the applicable requirements of Section J.

The permittee shall maintain records of the location, date of installation, and manufacturer's specifications for each pump as well as emission calculations for each pneumatic controller.

40 CFR Part 63 Subpart HHH National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities does not apply to this facility. Per §63.1270(a), "This subpart applies to owners and operators of natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution

company), and that are major sources of hazardous air pollutants (HAP) emissions as defined in §63.1271. Based on the information in the application subject to this review, this facility is not a major source of HAPs and is not categorized as a transmission and storage facility. As such, this subpart does not apply.

Emissions and Control:

Natural Minor versus Synthetic Minor Permit Designation:

25 Pa. Code §121.1 defines *potential-to-emit* as the following:

> *The maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and limitations on hours of operation or on the type or amount of material combusted, stored or processed shall be treated as part of the design if the limitation or the effect it would have on emissions is Federally enforceable or legally and practicably enforceable by an operating permit condition…*

Air quality case-by-case operating permits in the Commonwealth classify facilities under one of three exclusive types: natural minor, synthetic minor, or major source (i.e. Title V). More stringent requirements and regulations may apply to a facility based on this classification.[1]

A natural minor facility is one in which the potential-to-emit for criteria pollutants, VOCs, and HAPs are below major source (i.e. Title V) emission thresholds *with* the use of air cleaning devices and *without* requiring the use of Federally enforceable and legally and practically enforceable permit limitations to reduce the facility's potential-to-emit to below major source thresholds.

Per 25 Pa. Code §121.1, a *synthetic minor facility* is defined as follows:

> *…an air contamination source subject to Federally enforceable conditions that limit the facility's potential to emit to less than the major facility thresholds specified in the definition of 'Title V facility'.*

In other words, if a facility has an unrestricted potential-to-emit that exceeds the major source thresholds, the potential-to-emit can be restricted to less than the major source thresholds, provided that requirements in the operating permit are Federally enforceable and legally and practically enforceable. This may include, but is not limited to, air cleaning devices, operating hour restrictions, throughput restrictions, monitoring, reporting, and recordkeeping requirements, or tracking actual emissions on a 12-month rolling basis, among others.

A *major facility* is defined in 25 Pa. Code §121.1 as the following, in relevant part:

…(i) A facility which emits, or has the potential-to-emit, 100 TPY [tons per year] or more of a regulated NSR pollutant, except that lower emissions thresholds apply as follows:
(A) Not applicable.
(B) Fifty TPY of VOCs in an area within an ozone transport region except for a severe or extreme nonattainment area for ozone.
(C) – (K) Not applicable.
(ii) For the purposes of applying the requirements of Chapter 127, Subchapter E to the owner or operator of a facility located in an ozone nonattainment area or in an ozone transport region which emits or has the potential to emit NOx, as follows:
(A) One hundred TPY or more of NOx in an ozone nonattainment area classified as marginal, basic or moderate.
(B) – (F) Not applicable.
(iii) Not applicable.
(iv) A facility which is major for VOCs or NOx is considered major for ozone.
(v) Not applicable.

[1] Facilities may also be permitted under general permits (GPs) if they meet certain requirements, though this would not be a case-by-case operating permit.

The entirety of the Commonwealth of Pennsylvania is designated by the EPA as a part of the Northeast Ozone Transport Region. As such, this carries the same designation as an area in moderate non-attainment for ozone. Since VOCs and NOx are precursors to forming ground-level ozone, regulating emissions of NOx and VOCs act as proxies for reducing ground-level ozone formation. Major source emission thresholds in moderate non-attainment areas for ozone are 50.0 TPY VOCs and 100.0 TPY NOx. For all other criteria pollutants, the major source thresholds are 100.0 TPY SOx, CO, PM-10, and PM-2.5. For hazardous air pollutants, the major source thresholds are 25.0 TPY of all combined HAPs and 10.0 TPY of any one individual HAP from a single facility.

Based on the potential-to-emit of criteria pollutants, VOCs, and HAPs, the facility is classified as either a natural minor, synthetic minor, or major source.[2]

Per the aforementioned definition of potential-to-emit, the calculation of potential-to-emit includes the maximum capacity of a source under physical and operational design and *includes* the use of air pollution control equipment (i.e. air cleaning devices). The classification of a facility as a natural minor, synthetic minor, or major facility is based on the potential-to-emit.

The potential-to-emit calculations at the Revolution Cryogenic plant include the maximum capacity of a source to emit pollutants under its respective physical and operational design and includes air pollution control equipment such as the use of combustor for truck loading and the amine unit thermal oxidizer. Because this facility's potential-to-emit is below major source thresholds and does not require additional Federally enforceable and legally and practicably enforceable permit conditions to reduce the potential-to-emit to below major source thresholds, this facility can be permitted as a natural minor.

Processing – Stabilization:

The existing stabilizer unit processes natural gas condensates received from the inlet pipeline system as well as condensates received via truck. The existing system consists of two distillation columns that work in series, the first takes the raw condensate and by running through the distillation tower produces a stable condensate that will be used as a feedstock for the second column. The overhead vapors off this first column are compressed and sent to the cryogenic system inlet. The second column takes stable condensate from the first column and will be further distilled to produce a product that is a marketable stabilized condensate with an RVP of approximately two (2) psi. The overhead vapor from this column will be a C_3+ product that will be condensed and pumped into the C_3+ pipeline along with the main plant C_3+ product.

Processing – Cryogenic Separation and Fractionation:

The gas stream entering the existing cryogenic unit will include natural gas from the pipeline and flash vapors from the stabilizer unit. The gas will be chilled to cryogenic temperatures first by mechanical refrigeration and then by expansion (where the pressure drop causes further reduction in temperature). Chilling the gas stream causes natural gas liquids (NGL) to condense out of the gas stream. The chilled gas/liquid stream is sent to the deMethanizer tower where the NGL will be collected in the bottoms of the tower (which feeds into the deEthanizer unit) and the vapor off the top of the tower is a marketable natural gas stream (residue gas) and is routed to the compressors for delivery to the residue gas pipeline.

[2] The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for six main pollutants, also known as "criteria" pollutants. The six criteria pollutants are as follows: carbon monoxide (CO), lead (Pb), ground-level ozone (O_3, which is regulated through NOx and VOCs since NOx and VOCs are precursors to ozone formation), particulate matter (as PM-10 and PM-2.5), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). "NAAQS Table". *U.S. EPA.* 7 Feb. 2024. Last accessed on 18 Sept. 2024. https://www.epa.gov/criteria-air-pollutants/naaqs-table.

The de-ethanizer will produce a marketable ethane product and a separate C_3+ products. The bottoms stream from the de-methanizer will enter the de-ethanizer tower where it will be separated such that the lighter ethane product leaves the top of the tower, gets condensed, and pumped into the ethane (C_2) product pipeline. The heavier components (a propane + mixture) will collect at the bottom of the de-ethanizer tower and get pumped into the C_3+ product pipeline.

The de-methanizer and de-ethanizer are closed systems that do not have a direct vent to the atmosphere. The HMO Heaters provide heat to the fractionation process. The fractionation equipment also contains process safety vents (PSV) and maintenance depressurization vents which are routed to the flare.

The natural gas throughput rating of the cryogenic unit is 200 MMscfd (station design inlet). The permittee noted in the application that on a short-term basis, the station may be able to operate up to 220 MMscfd and consequently, the potential emissions affected by gas throughput capacity reflect this rate as provided in the potential-to-emit calculations in the application.

The natural gas liquid (NGL) throughput capacity for the cryogenic unit is as follows:

- 8,420,112 gal/year 2-lb Condensate produced.
- 18,000 BPD C_2 produced (275 MMgal/year) produced.
- 13,500 BPD C_3+ produces (207 MMgal/year) produced.

Sources 201 and 203: Amine Units

The Amine Unit will remove CO_2 from the NGLs by putting the NGL stream in contact with a lean amine solution in a contactor tower. The amine solution has a natural affinity for CO_2 by absorption. The rich amine solution leaving the contactor tower (containing the CO_2) will be sent to a flash tank and an amine regeneration system where through heat and distillation the CO_2 will be removed from the amine solution.

The amine regeneration system includes an amine stripper tower and a small reboiler heater. Note that a small amount of hydrocarbons will also be absorbed in the amine solution at the contactor tower and these hydrocarbons will be liberated from the rich amine by the amine regeneration system. The existing amine unit vent is controlled by a thermal oxidizer (THERM-001). For the existing amine units, the flash tank vent is routed to the associated HMO Heaters for use as fuel and any excess flash gas will be controlled by the respective facility flare (FLARE-001). Potential-to-emit calculations assumed that all flash gas was routed to the flare.

Potential emissions for the amine unit were split via the still vent and the flash gas, with the still vent being controlled by the thermal oxidizer rated at a 99% destruction efficiency of VOCs and HAPs, and the flash gas being controlled by the maintenance, startup, and shutdown (MSS) plant flare, which is rated at a 98% destruction efficiency for VOCs and HAPs. The potential emissions for this air contamination device were based on the exhaust of the control devices, which were modeled using Bryan Research & Engineering, LLC ProMax® modeling software. The maximum still vent flow rate to the thermal oxidizer is 380 lbs/hr, and for the flash gas, 139 lbs/hr. Potential emissions were based on 8,760 hours of operation per year.

Source 301: Condensate and Miscellaneous Storage Tanks

Storage of stabilized condensate occurs in two (2) existing storage tanks (TK-811A and TK-811B). Loadout from the storage tanks is controlled by an existing enclosed combustor (COMB-001). Storage tanks of various sizes will be utilized to store materials such as engine oil, compressor oil, amine, produced water, slop, and methanol. In accordance with 25 Pa. Code §127.14(a)(8) exemption no. 15, storage vessels for volatile organic compounds (which do not contain HAP) which have capacities less than 10,000 gallons are exempt from Plan Approval. Therefore, some of the non-HAP containing storage tanks are exempt.

Table VI:
Storage Tank Emissions

Source	Capacity	Tank Contents	Tank Type	Annual Throughput		No. of Tanks	VOC		HAPs		Methane		CO_2	
	Gal			Gal/yr (each)	bbl/day (each)		lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
Condensate Tanks (U-406A & U-406B)	90,000	Pressurized Condensate	Bullet (Pressurized)	27,488,880	1,793	2	---	0.77	---	---	---	---	---	---
2-lb TVP Condensate Tank (TK-811A & TK-811B)	21,000	2-lb Condensate	Fixed Roof w/ Gas Blanket Controlled by COMB-001	8,420,112	549	2	0.21	0.90	0.01	0.04	0.10	0.45	---	---
Methanol Tank	500	Methyl Alcohol	Horizontal	6,000	0.39	1	0.00	0.01	0.00	0.01	---	---	---	---
Oil Tanks	280-11,760	New/Used Compressor Oil & Liquids	Fixed Roof/Horizontal	274,008	17.87	10	0.00	0.00	0.00	0.00	---	---	---	---
Slop Tank	Varies	Waste Fluids	Fixed Roof	558,240	36.41	6	0.04	0.18	0.00	0.01	0.16	0.70	0.06	0.26
R.O. Water Storage Tank	16,800	R.O. Water	Fixed Roof	201,600	---	2	---	---	---	---	---	---	---	---
Amine Storage Tank	8,820	Amine/Water	Fixed Roof w/ Gas Blanket	105,840	---	1	0.00	0.01	0.00	0.00	0.01	0.05	---	---
Amine Drain Tank	4,200	Amine/Water	Fixed Roof	50,400	---	2	---	---	---	---	---	---	---	---
Propane Storage Tank	5,000	Propane	Pressurized	N/A (Pressurized)	---	1	---	---	---	---	---	---	---	---
Open Drain Tank	4,000	Oil/Water Mixture (assume 1% Condensate)	Fixed Roof	24,000	0.10	2	0.04	0.20	0.00	0.00	---	---	---	---
Total:	---	---	---	**37,129,080**	**2,397**	**29**	**0.30**	**2.07**	**0.01**	**0.06**	**0.27**	**1.20**	**0.06**	**0.26**

1. ProMax® was used to estimate methanol, lube oil, and slop tank emissions.
2. Miscellaneous tanks may include tanks for TEG and MEG. Vapor pressure for these two liquids so low that emissions assumed to be negligible.
3. AP-42 Chapter 7 formulas used to calculate emissions from 2-lb condensate tanks and slop tanks using parameters/compositions as calculated via Promax® software.
4. Tank emissions are calculated on maximum expected throughput (if known). For smaller tanks, calculations conservatively assume one turnover per month (open drain tank is once every other month.
5. No emissions result from high pressure condensate pressurized tanks under normal operations. Truck unloading calculations are included here; please see unloading calculations tables for detail.
6. The following tanks will be equipped with a residue gas blanket for safety: 2-lb stabilized condensate and amine.
7. Stabilized condensate tank emissions will be controlled by the truck loading combustor at 99%. Loading emissions for 2-lb condensate tank are included here; please see loading calculations tables for detail.
8. Emissions include working and breathing losses.

Source 401: Heaters

Source 401 consists of a number of heaters and regenerators. These sources were determined to be exempt from plan approval but not operating permit requirements under 25 Pa. Code §127.14(d) listed as No. 39 in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8). Natural gas-fired indirect heaters provide process heat to the processing units as well as the condensate stabilizers. The heaters are capable of operating continuously.

Source HTR-001: 6.22 MMBtu/hr Dehydration Unit Regenerator Heater

This heater is part of the natural gas liquid dehydration process where the natural gas liquid stream is stripped of all water. The heaters are used in the regeneration of the mole sieve beds where it heats the natural gas liquid stream as it circulates through the bed being regenerated. The heated natural gas liquid vaporizes the water in the bed where it is then condensed downstream and removed from the stream. Once the bed is free of water, the regeneration system goes into stand-by or switches to the next bed as needed to be regenerated.

The facility designates the 6.22 MMBtu/hr dehydration unit regenerator heater as HTR-001. Emissions of criteria pollutants from this source were based on AP-42, Table 1.4-1 emission factors (for NOx and CO) and Table 1.4-2 emission factors for VOC, SOx, PM-10, and PM-2.5 (FIL + CON). HAP emissions were calculated using emission factors from Tables 1.4-3 and 1.4-4, and greenhouse gases were calculated using 40 CFR Part 98, Tables C-1 & C-2. This chapter of AP-42 provides emission factors related to natural gas combustion. Potential emissions were based on a higher heating value of 1,009 Btu/scf, a heat input of 6.22 MMBtu/hr, a potential fuel consumption of 54,487 MMBtu/hr and 54.0 MMscf/yr, and 8,760 hours of operation per year.

Source HTR-002: 8.50 MMBtu/hr Regenerator Gas Heater

This heater is part of the inlet gas mole sieve dehydration process where the gas stream is stripped of all water. The heater is used in the regeneration of the mole sieve beds where it heats the gas stream as is circulates through the bed being regenerated. The heated gas vaporizes the water in the bed which is then condensed downstream and removed from the stream. Once the bed is free of water, the regeneration system goes into stand-by or switches to the next bed as needed to be regenerated. The mole sieve dehydration process itself will be a closed system that does not vent to the atmosphere.

The facility designates the 8.50 MMBtu/hr regenerator gas heater as HTR-002. Prior general permits authorized up to two (2) of these heaters, though one (1) heater is currently on site. Emissions from this source were calculated using the same methodology as for HTR-001, the dehydration unit regenerator heater. This source has an annual fuel consumption of 73.8 MMscf/yr and 74,480 MMBtu/yr.

Sources HTR-003 – HTR-005: Three (3) 40.92 MMBtu/hr HMO Heaters

The facility designates three (3) 40.92 MMBtu/hr HMO heaters as HTR-003, HTR-004, and HTR-005, respectively. These sources are permitted under the Department’s GP-1 (where individual heat inputs are greater than 10 MMBtu/hr and less than 50 MMBtu/hr).

These heaters are part of the hot oil system which provide heat to various uses throughout the plant. The uses include the inlet gas preheater, condensate stabilization system, deMethanizer trim reboiler, deEthanizer reboiler, and Amine regeneration reboiler.

Each of the three (3) heaters are rated at 40.92 MMBtu/hr with an annual fuel consumption of 355.3 MMscf/yr. Emissions of NOx, CO, PM-10, and PM-2.5 were based on the manufacturer’s guarantee. Emissions of VOCs and SOx were based on AP-42, Table 1.4-2 emission factors and Tables 1.4-3 and 1.4-4 for HAPs. Greenhouse

gases were calculated using 40 CFR Part 98, Tables C-1 & C-2. Like the other heaters, calculations assumed 8,760 hours of operation per year and a higher heating value of 1,009 Btu/scf.

Sources HTR-006: Catalytic Heaters

The facility designates fifteen (15) 0.06 MMBtu/hr catalytic heaters as HTR-006. These sources have also been permitted under the Department's GP-1 (where individual heat inputs are greater than 10 MMBtu/hr and less than 50 MMBtu/hr) along with the three (3) HMO Heaters referenced above. These heaters serve to heat various buildings and processes within the Revolution Cryogenic Plant. Each of the fifteen (15) units are rated at 0.06 MMBtu/hr (0.85 MMBtu/hr combined), with an annual fuel consumption of 0.5 MMscf/yr/unit at 8,760 hours of operation per year. Similar to the HMO Heaters, potential emissions of NOx, CO, PM-10, and PM-2.5 from the catalytic heaters were based on the manufacturer's guarantee. Emissions of VOCs and SOx were based on AP-42, Table 1.4-2 emission factors and Tables 1.4-3 and 1.4-4 for HAPs. Greenhouse gases were calculated using 40 CFR Part 98, Tables C-1 & C-2. Like the other heaters, a higher heating value of 1,009 Btu/scf was used.

Source 501: Pneumatic Devices

The facility has two (2) Inboard Stroke intermittent-bleed pneumatic controllers with a Bettis/G5020 double acting actuator. Although the pneumatics are air-actuated (and required to be per Subpart OOOOa), gas loss was calculated using the manufacturer's controller data and engineering estimates for the volumes of associated tubing. Emissions were based on the volume of gas lost per actuation, the estimated number of actuations per year, a representative gas analysis, Table 2-4 of the EPA Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017) for VOC and HAPs, and 40 CFR Part 98, Table W-1A for greenhouse gases.

Table VII:
Emissions from Pneumatic Controllers

Type of Compressors	Number of Devices	Volume of Gas Per Actuation	Actuations /Yr	Total Volume of Gas Emitted	Potential VOC Emissions	Potential HAP Emissions	Potential CO_2 Emissions	Potential CH_4 Emissions
---	---	scf/each	actuations/yr	scf/yr	TPY	TPY	TPY	TPY
(2) Intermittent Bleed Controllers	2	63	104	13,164	0.07	0.00	0.00	0.21

Source 601: Venting/Blowdowns & Electric Compressors

Equipment blowdowns release gas to the atmosphere. Blowdowns occur when a piece of equipment such as an engine, compressor, or filter need to be emptied to allow for maintenance in a safe manner. Blowdowns may be limited to specific pieces of equipment, such as a single compressor engine, whereas an emergency shutdown (ESD) is the evacuation of process gas from all or most of the air contamination sources and air cleaning devices at the facility.

Rev Cryo utilizes reciprocating and screw compressors at various points in the process. Existing electric drive reciprocating compressors are utilized to compress residue gas for transport in the pipeline. Reciprocating compressors are also utilized to compress overhead vapors from the existing stabilizer (routed to the cryogenic unit). The existing stabilizer overhead reciprocating compressors are equipped with a closed vent system to capture rod packing emissions and control them in an enclosed combustor (COMB-001).

Using estimated volumes of equipment and a site-specific gas analysis, emissions from venting and blowdowns were collectively estimated to be 13.70 TPY VOC, 0.86 TPY total HAP, and 964 TPY CO_2e. Assuming ten (10) minutes per blowdown event, this equates to twenty-two (22) hours per year of active blowdowns, or 132 blowdown events per year.

Table VIII:
Emissions from Venting/Blowdowns

Blowdown Emissions Sources	No. of Units	Events/yr	Gas Volume/Event	Controlled by Flare?	Potential Volume Emitted	Actual Volume Emitted	Potential VOC Emissions	Potential HAP Emissions	Potential CO_2 Emissions[1]	Potential CH_4 Emissions[1]
---	---	---	scf	Y/N	scf/yr	scf/yr	TPY	TPY	TPY	TPY
Residue Compressor (Electric)	3	72	55,000	Y	3,960,000	79,200	0.001	0.00	0.01	1.65
Stabilizer Compressor Downtime (Electric)	---	---	---	Y	1,286,930	25,739	0.84	0.00	0.00	0.11
Moisture Analyzer	---	---	---	N	131,400	131,400	0.73	0.05	0.04	2.11
VRU Compressor Blowdowns	1	24	50	Y	1,200	24	0.00	0.00	0.00	0.00
Facility Maintenance	---	---	---	N	300,000	300,000	1.66	0.11	0.09	4.83
Stabilizer Compressor (Electric)	3	36	10,000	Y	360,000	7,200	0.23	0.00	0.00	0.03
Miscellaneous Blowdowns	---	---	---	Y	92,592,000	1,851,840	10.24	0.70	0.54	29.79
Total:	**7**	**132**	**65,050**	**---**	**98,631,530**	**2,395,403**	**13.70**	**0.86**	**0.67**	**38.52**

[1] VOC, HAP, CH_4, and CO_2 emissions are based on fractions of these pollutants as follows:

	Wt % VOC	Wt % HAP	Wt. % CO_2	Wt % CH_4	MW
Residue Gas	0.06	0.00	0.80	96.68	16.31
Stabilizer Overhead	66.01	0.22	0.01	8.67	37.34
Inlet Gas	19.76	1.34	1.03	57.48	21.21

[2] The gas volumes are estimated based on facility design and standard engineering calculations.
[3] Per footnote in Section H10 of GP-5 Application Form and GP-5 Application Instructions (Revised 1/2015), emissions include blowdowns.
[4] Where applicable, emissions are calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
[5] GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).

There are also a few other sources of venting at this facility, including flare purge gas, closed drain vapors, and eleven (11) gas chromatography (GC) analyzers.

Table IX:
Miscellaneous Venting Emissions

Blowdown Emissions Sources	Controlled by Flare?	Total Volume NG	Actual Volume NG Emitted	Potential VOC Emissions	Potential HAP Emissions	Potential CO_2 Emissions[7]	Potential CH_4 Emissions[7]
---	Y/N	scf/yr	scf/yr	TPY	TPY	TPY	TPY
Flare Purge Gas	Y	3,801,840	76,037	0.00	0.00	0.01	1.58
Closed Drain Vapors	Y	200,000	4,000	0.00	0.00	0.00	0.08
GC Venting (AE-101)	N	928	928	0.00	0.00	0.00	0.04
GC Venting (AE-102)	N	928	928	0.00	0.00	0.00	0.05
GC Venting (AE-103)	N	928	928	0.02	0.00	0.00	0.00
GC Venting (AE-104)	N	464	464	0.01	0.00	0.00	0.00
GC Venting (AE-105)	N	928	928	0.00	0.00	0.00	0.00
GC Venting (AE-106)	N	464	464	0.03	0.00	0.00	0.00
GC Venting (AE-107)	N	928	928	0.06	0.00	0.00	0.00
GC Venting (AE-108)	N	928	928	0.00	0.00	0.00	0.00
GC Venting (AE-109)	N	---	---	---	---	---	---
GC Venting (AE-110)	N	928	928	0.06	0.00	0.00	0.00
GC Venting (AE-111)	N	928	928	0.01	0.00	0.00	0.02
Total:	**---**	**4,010,192**	**88,389**	**0.19**	**0.00**	**0.01**	**1.77**

1. Uncombusted CH_4 and CO_2 emissions are based on fractions of these pollutants as follows: 945

	Vol % CO2	Vol % CH4
Residue Gas	0.298	98.312
Inlet Gas	0.498	76.098
C3+ Liquids	0.000	0.000
C2 Liquids	0.010	1.220

1. The gas volumes are estimated based on facility design and standard engineering calculations (utilizing Equation W-14B from 40 CR 98 Subpart W where appropriate).
2. Per footnote in Section H11 of GP-5 Application Form and GP-5 Application Instructions (Revised 1/2015), emissions include pigging operations and pipeline purging/venting.
3. Total purge gas to flare: 434 scfh
4. Where applicable, emissions are calculated in accordance with Equations W-31, W-35 and W-36 in Subpart W of 40 CFR 98.
5. GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).
6. Density as follows: C3+ and C2 liquid lines conservatively assume gas (vapor) composition is identical to liquid composition
   Value for 'lb VOC/scf' of total gas = Sum of (vol%/100 * MW (lb/lb-mol) /
   379 scf/lb-mol) for each VOC constituent CO : 0.0526
   kg/ft^3 for CO at 60 °F and 14.7 psia

   2 2

   CH : 0.0192 kg/ft^3 for CH at 60 °F and 14.7 psia

   4 4

   VOC: 2.40E-05 lb VOC/ft^3 of total gas (residue gas) HAP: 1.73E-09 lb HAP/ft^3 of total gas (residue gas) VOC: 1.11E-02 lb VOC/ft^3 of total gas (inlet gas)
   HAP: 7.52E-04 lb HAP/ft^3 of total gas (inlet gas)
   VOC: 1.43E-01 lb VOC/ft^3 of total gas (C3+ liquid vapors) HAP: 1.21E-02 lb HAP/ft^3 of total gas (C3+ liquid vapors)
8. Mol sieve instrumentation vent data: 3 Number of Units 5 SCF/hr, per unit

All emissions related to unplanned ESDs, should any occur, are required to be reported both as a malfunction and in annual AES emission inventory reports. Additionally, all malfunctions are evaluated for potential enforcement action.

The Department has included the following requirement for malfunction notifications in Section C of the proposed operating permit, in relevant part:

> *[The (malfunction) report shall describe the following] 7. the 12-month rolling sum of emissions (including, but not limited to, criteria pollutants, VOCs, benzene, methanol, formaldehyde, greenhouse gases, and total HAPs), including any emission increases that occurred as a result of the malfunction event.*

This requirement will allow an evaluation of the facility's actual emissions after each reportable malfunction event in relation to the facility-wide emission limitations.

ETC is required to report all malfunction events (e.g. emergency shutdowns) that occur and must track actual emissions on a 12-month rolling basis including any emissions resulting from malfunction events. Any emissions resulting from malfunction events are to be included in annual emission inventory reports (AES reports). In addition, the Department evaluates each malfunction notification for possible enforcement action.

It should be noted that only a subset of VOCs, HAPs, and greenhouse gases would be emitted directly from emergency shutdown events. NOx, CO, HCHO, and other criteria pollutants are a result of the combustion of the natural gas rather than from venting during an emergency shutdown event. NOx, CO, HCHO, and other criteria pollutants are not present in the inlet representative gas analysis included in the application subject to this review. The representative gas analysis included in the application lists the composition of the inlet natural gas stream to be various VOCs, HAPs, and greenhouse gases. Hence, only a subset of VOCs, HAPs, and greenhouse gases would be directly emitted from these events.

Sources 701: Fugitive Emission Sources

Source 701 comprises of fugitive emissions from component leaks, meaning fugitive emissions from valves, flanges, open-ended lines, connectors, pump seals, etc. Based on the proposed design criteria of the facility, there are approximately 34,279 fugitive emission components at this facility. Potential emissions of VOC and HAPs from fugitive component leaks were estimated using emission factors from Table 2-4 from EPA's Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017, November 1995) and a site-specific gas analysis. Emissions of greenhouse gases from fugitive emission components were calculated using the equations in 40 CFR 98, Table W-1A.

In addition, ETC implements the TCEQ 28VHP LDAR program with reductions found in APDG 6422v2, Revised 07/2022. The LDAR program implemented requires quarterly monitoring of components and welded or flanged connections. TCEQ estimated the reductions based on the average difference between Table 2.4 and Table 2.5 in the EPA 453/R-95-017, November 1995 document. The 28VHP Program includes boilerplate conditions that an operator must follow in order to claim the 28VHP reduction factors. This includes construction of both new and reworked piping, valves, pump systems, and compressor systems conforming to applicable codes and for piping connections to be welded or flanged. Per construction documentation provided by ETC, the facility was constructed in accordance with AWS D1.1 which specifies welding code. By following code, and by welding and flanging piping to certain standards (apart from screwing connections for piping less than 2-inches in diameter), the Department acknowledges the 28VHP program for the Revolution Cryogenic facility. By welding instead of screwing a connection together, the weld theoretically removes the connections and forms one pipe. In addition, ETC will follow the GP-5 BAT definition of fugitive leak for all components of 500 ppm.

The potential-to-emit after using estimated control efficiencies from an LDAR program for fugitive emission components are 5.11 TPY VOC, 0.30 TPY total HAP, 1,735 TPY CO_2e.

Source 204: Rod Packing

The permittee also included emissions from rod packing in overall fugitive emissions from the facility under Source 701 in the application but are designated as Source 204 for purposes of this review. Rod packing emissions from the electric compressors are controlled by an 11.3 MMBtu/hr enclosed combustor. The potential-to-emit of rod packing was calculated to be the following:

Table X:
Emissions from Rod Packing

Type of Compressors	Number of Compressors	Number of Throws per Compressor	Leak Factor	Total Volume NG Emitted	VOC	HAP	CO_2	CH_4
---	---	---	scf/hr/throw	scf/yr	TPY	TPY	TPY	TPY
Residue Compressor (Electric)	3	6	11.5	1,813,320	0.02	0.00	0.31	37.72
Stabilizer Compressor (Electric)	3	2	11.5	30,222	0.98	0.00	0.00	0.13
Centrifugal Dry Compressor Seal	1	1	16.2	141,912	0.78	0.05	0.04	2.28
Total:	**7**	**9**	**39.2**	**1,985,454**	**1.79**	**0.06**	**0.36**	**40.14**

1.) Emission factors from http://www.epa.gov/gasstar/documents/ll_rodpack.pdf.
2.) Stabilizer rod packing VRU control: 95%.
3.) Centrifugal compressor vendor data for seal rate (scfm): 0.27.
4.) VOC, HAP, CH_4, and CO_2 emissions are based on weight percent fractions from the gas analysis.

The combined potential-to-emit from fugitive emission components and rod packing at this facility are estimated to be 6.90 TPY VOC.

Source 702: Truck Loadout

For the purposes of this review, truck loadout has been designated as Source 702.

Table XI:
Condensate Loading & Unloading

Source	Description	No. of Trucks/Day	Truck Size	Avg. Daily Throughput	Annual Throughput	Trucks/Yr	True Vapor Pressure	VOC	
---	---	---	bbl	bbl/day	bbl/yr	---	psia	lbs/truck	TPY
Truck Loading Combustor (COMB-001)	Truck Hose Disconnect of High-Pressure Condensate Unloading	25	180	3,586.00	1,308,994.00	7,272	14.70	0.21	0.77
	Slop Hauling	---	---	218.49	79,748.57	---	---	---	2.54
	2-lb Condensate Hauling	---	---	1,098.51	400,957.72	---	---	---	0.29
Total Pre-Control:	---	---	---	4,903.00	1,789,700.29	---	---	---	**3.60**

1. Estimated typical parameters from similar loading operations.
2. The hose will be capped as soon as it is disconnected from the truck. It is assumed that all of the vapor from the soft hose is released (worst case emissions) and all of the vapor from the pipe above atmospheric pressure (14.7 psia) or gauge pressure is released. The vapor area released is calculated by taking the volume of the hose and piping multiplied by the pressure fraction released. The entire volume of the hose is assumed to be released, but only the pressure above atmospheric or gauge pressure of the pipe.
3. Per HYSIS scenario for facility. Conservatively assumes the liquid molecular weight as the vapor molecular weight and vapor pressure equal to atmospheric.
4. Slop Hauling and 2-lb Condensate Hauling loading losses of 1.52 lbs/1,000 gallons. Uncontrolled 2-lb condensate hauling emissions are 12.76 TPY VOC. Emissions are controlled by C702, an 11.2 MMBtu/hr Truck Loading Combustor.

Source 801: Pigging

The existing facility has one (1) 30" station inlet pig receiver and one (1) 12" C_3+ pipeline pig launcher, with control by the enclosed plant flare. Potential emissions estimated 73 receiving events per year at 20,000 scf of natural gas vented per event, and four (4) receiving events per year at 834 lbs of gas vented per event. The total potential volume of gas released from pigging operations were estimated to be 1,460,000 scf/yr. Actual volumes of gas released from pigging operations are approximately 69,216 scf/yr. Chamber volumes were based on facility design. Emissions were based on the chamber volumes and anticipated volumes of gas released, the gas composition, and the gas density. Potential emissions from pigging operations were calculated to be 0.43 TPY VOC, 0.03 TPY total HAP, 0.03 TPY CO_2, and 1.11 TPY CH_4.

Table XII:
Emissions from Pigging

Sources	Events/Yr	Gas Volume per Event	Total Mass per Event	Controlled by Flare?	Total Volume NG	Total Mass	Actual Volume NG Emitted	Potential VOC Emissions	Potential HAP Emissions	Potential CO_2 Emissions[7]	Potential CH_4 Emissions[7]
---	---	scf	lbs	Y/N	scf/yr	lbs/yr	scf/yr	TPY	TPY	TPY	TPY
Pig Receiving 30" Station Receiver	73	20,000	---	Y	1,460,000	---	69,016	0.38	0.03	0.02	1.11
Pig Launching 12" C3+ Launcher	4	---	834	Y	---	3,337	200	0.05	0.00	0.01	0.00
Total:	**77**	**20,00**	**834**	**Y**	**1,460,000**	**3,337**	**69,216**	**0.43**	**0.03**	**0.03**	**1.11**

In addition, the permittee will be required to employ best management practices to minimize the liquids present in the pig receiver chamber and to minimize emissions from the pig receiver chamber. These best management practices shall include, but not be limited to, the following:

1.) Connecting each high-pressure pig launcher and receiver by jumper lines to a low-pressure gathering line;
2.) Operating jumper lines to depressurize such launcher and receivers prior to opening the launcher or receiver hatch;
3.) Installing and using pig ramps in pig receivers;
4.) Installing liquids drain;
5.) Using ball valve type chambers or multiple pig chambers when appropriate; and
6.) Ensuring that the pigging chambers are charged with gas when conducting quarterly leak detection and repair (LDAR) monitoring.

Control Device C202-2 (Flare-001): Maintenance, Startup, and Shutdown (MSS) Flare

Emissions of NOx, CO, and SOx from the maintenance, startup, and shutdown (MSS) flare were calculated using AP-42, Section 13.5 emission factors for industrial flares. The flare is a non-smoking flare and is expected to have no particulate emissions. Greenhouse gas emissions were calculated using emission factors from 40 CFR Part 60 Subpart 98, Tables C-1 and C-2. Emissions of NOx, SOx, CO, and GHGs are a result of combustion in the flare. The flare is rated at a 98% destruction efficiency of VOCs and HAPs. The calculated loading to the flare is 906 MMBtu/hr and has an associated 0.34 MMBtu/hr pilot that consumes 337 scf/hr.

The MSS flare controls purge gas, residue gas from compressor blowdowns, closed drain vapors, pigging vapors (30" receiver and 12" launcher), amine unit flash gas, stabilizer rod packing, stabilizer compressor

blowdowns, and venting. Purge gas is required for the operation of the flare, and the purge gas composition was based on a ProMax® run at design conditions and normal facility operating conditions. The amine unit flash tank gas is used as fuel for the HMO heaters, and any excess gas is routed to the MSS flare. The calculations conservatively assumed that all of the flash tank gas is sent to the flare.

Control Device C204 (COMB-001): Combustor for Truck Liquid Loading of 2-lb Condensate

Emissions of criteria pollutants and HAPs from the combustor controlling truck loadout of 2-lb condensate were calculated using AP-42, Section 1.4 emission factors for natural gas combustion. Greenhouse gas emissions were calculated using equations from 40 CFR Part 60 Subpart 98, Tables C-1 and C-2. The air cleaning device is rated at a 99% destruction efficiency of VOC and HAPs, with a calculated loading of 1.0 MMBtu/hr and 5,937.65 MMBtu/yr and an estimated 1,150 hour of operation per year. The pilot light consumes 85 scf/hr and is rated at 0.086 MMBtu/hr. The pilot light is continuously lit and was assumed to run at 8,760 hours of operation per year for purposes of potential-to-emit calculations. This air cleaning device controls truck vapors, displaced blanket gas, and displaced tank vapors.

Control Device C201 (THERM-001): Thermal Oxidizer Controlling Amine Vent

Emissions of criteria pollutants and HAPs from the thermal oxidizer controlling the amine vent were calculated using AP-42, Section 1.4 emission factors for natural gas combustion. Greenhouse gas emissions were calculated using equations from 40 CFR Part 60 Subpart 98, Tables C-1 and C-2. The air cleaning device is rated at a 99% destruction efficiency of VOC and HAPs, with a calculated loading of 1.07 MMBtu/hr and 9,396 MMBtu/yr and an estimated 8,760 hours of operation per year. The pilot light consumes 266 scf/hr and is rated at 0.27 MMBtu/hr. The pilot light is continuously lit and was assumed to run at 8,760 hours of operation per year for purposes of potential-to-emit calculations. Gas composition data from the amine vent stream were modeled using ProMax® software.

Table XIII:
Site-Specific Gas Analysis at the Plant Inlet

Constituent	Natural Gas Stream Speciation (Vol. %)	Natural Gas Stream Speciation (Wt. %)	MW g/mol
N_2	0.3787	0.4996	28.01
METHANE	76.0979	57.4840	16.04
CO_2	0.4983	1.0327	44.01
ETHANE	14.9106	21.1114	30.07
PROPANE	5.0034	10.3888	44.10
I-BUTANE	0.5582	1.5276	58.12
N-BUTANE	1.3655	3.7371	58.12
I-PENTANE	0.2890	0.9820	72.15
N-PENTANE	0.3787	1.2867	72.15
I-HEXANES	---	---	86.18
N-HEXANE	0.2591	1.0515	86.18
BENZENE	0.0022	0.0081	78.11
CYCLOHEXANE	0.0130	0.0513	84.16
HEPTANES	0.0857	0.4044	100.21
TOLUENE	0.0030	0.0130	92.14
2,2,4 Trimethylpentane	0.0498	0.2680	114.23
N-OCTANE	0.0054	0.0289	114.24
E-BENZENE	0.0002	0.0010	106.17
m,o,&p-XYLENE	---	---	106.16
I-NONANES	0.0007	0.0042	128.20
N-NONANE	---	---	128.20
I-DECANES	0.0011	0.0073	142.29
N-DECANE	---	---	142.29
I-UNDECANES +	---	---	142.29
Totals:	**99.9010**	**99.8880**	**---**
TOC (Total):	**99.0240**	**98.3550**	**---**
VOC (Total):	**8.0150**	**19.7600**	**---**
HAP (Total):	**0.3140**	**1.3420**	**---**

HHV: 1,152 Btu/scf

Table XIV:
Facility-Wide Potential-to-Emit by Source

Source	Description		Capacity	Pollutants																			
				VOC		NO_X		CO		Methanol (CH_3OH)		Formaldehyde (CH_2O)		Benzene (C_6H_6)		Total HAPs		PM_{10}[3]		$PM_{2.5}$[3]		SO_X		GHG (CO_2e)	
				lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
031	HMO Heater (HTR-003)		40.92 MMBtu/hr	0.22	0.98	1.64	7.17	1.64	7.17	---	---	0.00	0.01	0.00	0.00	0.08	0.34	0.57	2.51	0.57	2.51	0.02	0.11	4,792	20,991
032	HMO Heater (HTR-004)		40.92 MMBtu/hr	0.22	0.98	1.64	7.17	1.64	7.17	---	---	0.00	0.01	0.00	0.00	0.08	0.34	0.57	2.51	0.57	2.51	0.02	0.11	4,792	20,991
033	HMO Heater (HTR-005)		40.92 MMBtu/hr	0.22	0.98	1.64	7.17	1.64	7.17	---	---	0.00	0.01	0.00	0.00	0.08	0.34	0.57	2.51	0.57	2.51	0.02	0.11	4,792	20,991
201	Amine Vent (AMINE-001)		200 MMscfd	0.55	2.42	---	---	---	---	0.00	0.01	---	---	0.00	0.01	0.03	0.12	---	---	---	---	---	---	343	1,504
204	Rod Packing		1,985,454 scf/yr	---	1.79	---	---	---	---	---	---	---	---	---	---	---	0.06	---	---	---	---	---	---	---	1,004
301	Storage Tanks[1]	90,000-gallon Condensate Tanks (Each)	90,000-gal (each)	0.30	2.07	---	---	---	---	0.00	0.01	---	---	---	---	0.01	0.06	---	---	---	---	---	---	0.27	1.20
		21,000-gallon 2-lb RVP Condensate Tanks (Each)	21,000-gal (each)																						
		Miscellaneous Tanks	500-16,800-gallons each																						
401	NGL Dehy Regen Heater (HTR-001)		6.22 MMBtu/hr; 54 MMscf/yr	0.03	0.15	0.62	2.70	0.52	2.27	---	---	0.00	0.00	0.00	0.00	0.01	0.05	0.05	0.21	0.05	0.21	0.00	0.02	728	3,191
	Regenerator Gas Heater (HTR-002)		8.5 MMBtu/hr; 73.8 MMscf/yr	0.05	0.20	0.84	3.69	0.71	3.10	---	---	0.00	0.00	0.00	0.00	0.02	0.07	0.06	0.28	0.06	0.28	0.01	0.02	996	4,360
	Fifteen (15) Catalytic Heaters		0.85 MMBtu/hr (Total); 7.3 MMscf/yr	0.00	0.02	0.03	0.15	0.03	0.15	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7	31
501	Pneumatic Devices/Tubing (2 air-actuated intermittent-bleed)		13,164 scf/yr	0.02	0.07	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	---	---	1.21	5.30
601	Venting/Blowdowns[2,4]		98,719,919 scf/yr	---	13.81	---	---	---	---	---	---	---	---	---	---	---	0.86	---	---	---	---	---	---	230	1,008
701	Fugitive Emissions - Component Leaks		27,300 lbs/yr post-control	1.58	5.11	---	---	---	---	---	---	---	---	---	---	0.07	0.30	---	---	---	---	---	---	396	1,735
702	Truck Loadout/Combustor for Tank Loading		---	---	0.04	0.11	0.33	0.09	0.28	---	---	---	---	---	---	0.00	0.01	0.01	0.02	0.01	0.02	0.00	0.00	1,171	2,495
801	Pigging Operations[4]		1,460,000 scf/yr	---	0.43	---	---	---	---	---	---	---	---	---	---	---	0.03	---	---	---	---	---	---	---	28
FLARE-001	MSS Flare (FLARE-001)[5]		---	---	---	61.66	1.65	281.08	7.52	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.53	0.01	76,305	2,974
THERM-001	Thermal Oxidizer (THERM-001)/Rod Packing Combustor		---	---	---	0.13	0.58	0.11	0.48	---	---	---	---	---	---	---	---	0.01	0.04	0.01	0.04	0.00	0.00	158	692
Total:	**---**		**---**	**3.19**	**28.94**	**68.30**	**30.60**	**287.44**	**35.30**	**0.01**	**0.03**	**0.01**	**0.05**	**0.00**	**0.01**	**0.37**	**2.51**	**1.85**	**8.09**	**1.85**	**8.09**	**0.62**	**0.38**	**94,712**	**82,000**

[1] Truck loading (truck hose disconnect 0.77 TPY VOC, slop hauling 2.54 TPY VOC, and 2-lb condensate hauling 0.29 TPY VOC, totaling 3.60 TPY VOC) are minor at approximately 0.04 TPY VOC after the 99% destruction efficiency from the combustor is applied. Emissions summed with the storage tank emissions on the table "Storage Tank Emissions Calculations" on page 89 of the application.
[2] Includes residue compressor (electric), stabilizer compressor downtime (electric), moisture analyzer, VRU compressor blowdowns, facility maintenance, stabilizer compressor (electric), gas chromatography, and miscellaneous blowdowns. High lb/hr rate of NOx and CO from the MSS flare relative to TPY values assume maximum short-term, high flow situations such as an ESD.
[3] PM-10 and PM-2.5 emissions are filterable + condensable.
[4] Short-term emissions rates from limited duration activities (ex. pigging, compressor blowdowns) are not included in the 'lb/hr' values. All potential emissions are, however, included in the 'TPY' value.
[5] Facility flare based on limited operations; equivalent to 53.5 hours of operation per year.

Table XV:
Facility-Wide Actual and Potential Emissions by Pollutant

Pollutant	Potential Emissions (lbs/hr)	Potential Emissions (TPY)	2023 Actual Emissions (TPY)[c]
NOx	68.30	30.60	13.12
CO	287.44	35.30	17.84
VOC	3.19	29.09	13.60
SO_2	0.62	0.38	0.16
PM-10[b]	1.85	8.09	0.93
HAP (Total)	0.37	2.51	0.79
Formaldehyde	0.01	0.05	0.01
Benzene	0.00	0.01	0.01
Hexane[d]	0.34	2.33	0.74
Methanol	0.01	0.03	0.01
CO_2e[a]	94,484.00	80,998.00	33,495.00

[a]Based on CO_2e equivalents of CH_4, N_2O, and CO_2 as reported in the 2022 AES report. [b]Assume PM-10 = PM-2.5. Includes PM-FIL and PM-CON. [c]As reported. [d] Used a ratio, so this is an approximate PTE for hexane.

Conclusion:

I have completed my review of the initial state-only operating permit application for the ETC Northeast Pipeline, LLC natural gas processing plant located in Smith Township, Washington County. The applicant has met the regulatory requirements associated with this application submittal. The attached permit reflects the terms and conditions as described in the permit application. I recommend that ETC Northeast Pipeline, LLC be granted authorization to operate the following sources:

- Sources 031-033, three (3) 40.92 MMBtu/hr HMO heaters;
- Source 201, one (1) 200 MMscfd amine sweetening unit controlled by a 1.07 MMBtu/hr thermal oxidizer;
- Source 204, Rod Packing controlled by an 11.3 MMBtu/hr combustor;
- Source 301, two (2) 90,000-gallon condensate tanks, two (2) 21,000 2-lb RVP tanks controlled by a 1.0 MMBtu/hr truck loading combustor, and miscellaneous storage tanks with varying capacities between 500 and 16,800-gallons;
- Source 401, one (1) 6.22 MMBtu/hr NGL dehydration regenerator heater, one (1) 8.5 MMBtu/hr regenerator gas heater, and fifteen (15) catalytic heaters totaling 0.85 MMBtu/hr;
- Source 501, Pneumatic Devices, consisting of two (2) intermittent-bleed pneumatic devices;
- Source 601, Venting/Blowdowns, including residue compressor (electric), stabilizer compressor downtime (electric), moisture analyzer, VRU compressor blowdowns, facility maintenance, stabilizer compressor (electric), and miscellaneous blowdowns;
- Source 701, Fugitives, consisting of fugitive emission components (valves, flanges, connectors, etc.);
- Source 702, Truck Loadout controlled by a 1.0 MMBtu/hr truck loading combustor;
- Source 801, Pigging Operations, consisting of one (1) pig receiver and one (1) pig launcher; and
- One (1) maintenance, startup, and shutdown (MSS) facility flare rated at 906 MMBtu/hr.

I recommend the issuance of a natural minor state-only operating permit for this facility upon completion of the public comment period. Notice of intent to issue this state-only operating permit will be published in the *Pennsylvania Bulletin*. The company, the Air Quality District Supervisor, and the Air Quality inspector will be provided with this proposed state-only operating permit.