Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

Barron, Sarah K <sarah.k.barron@wv.gov> Thu, Aug 21, 2025 at 4:45 PM
To: David Keatley <david_keatley@tcenergy.com>

David,

Thanks for the response. The installation year in the emission units table needs to be updated to document the year that the current unit was installed as well as to document in the permit that the change took place, even if the change was a like-kind unit replacement. I'm hoping that the notices for the public and EPA comment periods will be able to be published next week, and you should receive a message with the dates of the comment periods once the notice is published.

Thanks,
- Sarah
[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

David Keatley <david_keatley@tcenergy.com> Thu, Aug 21, 2025 at 7:38 AM
To: "Barron, Sarah K" <sarah.k.barron@wv.gov>

Sarah,

I enjoyed talking with you as well. I am ok with the revised Emission Units Table. The only thing I will add is, I always listed the original installation date for the installation date since that was the date that was important for NSR. Using the installation date for a like kind replacement is more accurate, but I cannot think of a reason it adds value.

[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

Barron, Sarah K <sarah.k.barron@wv.gov> Thu, Aug 21, 2025 at 7:06 AM
To: David Keatley <david_keatley@tcenergy.com>

Hi David,

Do you have any further comments on the pre-draft permit or fact sheet for the Sherwood Compressor Station?

Thanks,
- Sarah

[Quoted text hidden]

West Virginia Secretary of State — Online Data Services

Business and Licensing

Online Data Services Help

Business Organization Detail

NOTICE: The West Virginia Secretary of State's Office makes every reasonable effort to ensure the accuracy of information. However, we make no representation or warranty as to the correctness or completeness of the information. If information is missing from this page, it is not in the The West Virginia Secretary of State's database.

COLUMBIA GAS TRANSMISSION, LLC

Organization Information

Org Type	Effective Date	Established Date	Filing Date	Charter	Class	Sec Type	Termination Date	Termination Reason
LLC | Limited Liability Company	5/27/1971		5/27/1971	Foreign	Profit			

Organization Information

Business Purpose	4862 - Transportation and Warehousing - Pipeline Transportation - Pipeline Transportation of Natural Gas	**Capital Stock**	
Charter County		**Control Number**	0
Charter State	DE	**Excess Acres**	0
At Will Term	A	**Member Managed**	MBR
At Will Term Years		**Par Value**	
Authorized Shares		**Young Entrepreneur**	Not Specified

Addresses

Type	Address
Mailing Address	700 LOUISIANA STREET SUITE 1300 HOUSTON, TX, 77002 USA
Notice of Process Address	CORPORATION SERVICE COMPANY 808 GREENBRIER STREET CHARLESTON, WV, 25311
Principal Office Address	700 LOUISIANA STREET SUITE 1300 HOUSTON, TX, 77002 USA
Type	**Address**

Officers

Type	Name/Address
Member	COLUMBIA PIPELINE GROUP, INC. 700 LOUISIANA STREET SUITE 1300 HOUSTON, TX, 77002
Type	**Name/Address**

Name Changes

Date	Old Name
1/30/2009	COLUMBIA GAS TRANSMISSION CORPORATION
Date	**Old Name**

Subsidiaries

Name	Address
	NISOURCE, INC 801 E 86TH AVENUE MERRILLVILLE, IN, 46410 USA
Name	**Address**

Date	Amendment

1/30/2009	CONVERSION FILED CHANGING NAME FROM COLUMBIA GAS TRANSMISSION CORPORATION
11/19/1997	AMEND TO ARTICLES OF INCORPORATION
1/4/1991	MERGER; MERGING COMMONWEALTH GAS PIPELINE CORPORATION, A NON QUAL VA CORP, WITH AND INTO COLUMBIA GAS TRANSMISSION CORPORATION, A QUAL DE CORP, THE SURVIVOR.
11/14/1984	AMENDMENT: TO THE ARTICLES OF INCORPORATION.
3/31/1982	AMENDMENT: TO THE ARTICLES OF INCORPORATION.
3/2/1982	AMENDMENT: CERTIFICATE OF AMENDMENT
7/12/1973	AMENDMENT: CERTIFICATE OF AMENDMENT; ROLL 73
6/5/1973	AMENDMENT: CERTIFICATE OF INCORPORATION; ROLL 72.
1/23/1973	MERGER AMENDMENT: THE PRESTON OIL COMPANY MERGED WITH AND I NTO COLUMBIA GAS TRANSMISSION CORPORATION; ROLL 67.
7/29/1971	MERGER AMENDMENT: DUPLICATION OF ABOVE MENTIONED MERGER; RO LL 49
6/29/1971	MERGER: ATLANTIC SEABORD CORP., A DE CORP., CUMBERLAND AND ALLEGHENY GAS COMPANY, A WV CORP., THE MANUFACTURERS LIGHT AND HEAT COMPANY , A PA CORP., UNITED FUEL GAS COMPANY, A WV CORP., HOME GAS COMPANY, A NY CORP., KENTUCKY GAS TRANSMISSION CORPORATION, A DE CORP AND THE OHIO FUEL GAS COMPANY, AN OH CORP, MERGED WITH AND INTO COLUMBIA GAS TRANSMISSION CORPORATION, THE SURVIVOR. ROLL 48
Date	**Amendment**

Annual Reports

Filed For
2025
2024
2023
2022
2021
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Date filed

For more information, please contact the Secretary of State's Office at 304-558-8000.

Wednesday, July 16, 2025 — 3:14 PM

UC Defaulted Accounts Search Results

Sorry, no records matching your criteria were found.

FEIN:
Business name: COLUMBIA GAS TRANSMISSION, LLC
Doing business as/Trading as:

Please use your browsers back button to try again.

WorkforceWV	Unemployment Compensation	Offices of the Insurance Commissioner

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

Barron, Sarah K <sarah.k.barron@wv.gov> Thu, Aug 14, 2025 at 11:14 AM
To: David Keatley <david_keatley@tcenergy.com>

Hi David,

Thanks for speaking with me today. The revised Emission Units Table is attached to this email. Please let me know if you have any further comments.

Thanks,
- Sarah
[Quoted text hidden]

Sherwood - Revised Emission Units Table.pdf
276K

1.0 Emission Units and Active R13, R14, and R19 Permits

1.1. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
T1	T01	Solar Taurus 60 Turbine	2019	7,417 HP @ 32°F	None
T2	T02	Solar Taurus 60 Turbine	2019	7,417 HP @ 32°F	None
T3	T03	Solar Mars 100 Turbine	2024 [1]	15,427 HP @ 32°F	None
T4	T04	Solar Mars 100 Turbine	2024 [1]	15,427 HP @ 32°F	None
G1	G1	Waukesha VGF-P48GL Emergency Generator RICE	2019	1,175 HP	None
HTR1	H1	Process Heater	2019	1.50 MMBTU/hr	None
HTR2	H2	Process Heater	2019	0.80 MMBTU/hr	None
HTR3	SH1	Catalytic Heaters	Varies	2.88 MMBTU/hr (total)	None
A1	A01	Pipeline Liquids Storage Tank	2019	2,056 gal	None
A3	A03	Wastewater Storage Tank	2019	1,000 gal	None

[1] The Solar Mars 100 Turbines installed in 2024 are like-kind replacement units for the Solar Mars 100 Turbines originally installed at the Sherwood Compressor Station in 2019.

1.2. Active R13, R14, and R19 Permits

The underlying authority for any conditions from R13, R14, and/or R19 permits contained in this operating permit is cited using the original permit number (e.g. R13-1234). The current applicable version of such permit(s) is listed below.

Permit Number	Date of Issuance
R13-3313D	July 2, 2024

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

David Keatley <david_keatley@tcenergy.com> Mon, Aug 11, 2025 at 11:00 AM
To: "Barron, Sarah K" <sarah.k.barron@wv.gov>

Sarah,

This would be better, but it might still cause confusion with the construction date.

David Keatley

[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

Barron, Sarah K <sarah.k.barron@wv.gov> Thu, Aug 7, 2025 at 9:30 AM
To: David Keatley <david_keatley@tcenergy.com>

David,

The installation year should be the year that the current units were installed. I could add a footnote to the Emission Units Table of the permit which specifies that the turbines installed in 2024 were like-kind replacements for the turbines previously installed in 2019. Are there any issues with this change?

Thanks,
- Sarah
[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

David Keatley <david_keatley@tcenergy.com> Wed, Aug 6, 2025 at 10:43 AM
To: "Barron, Sarah K" <sarah.k.barron@wv.gov>

Sarah,

Since the turbines were replaced in like kind the installation date should not change.

David J. Keatley PE, PhD

Environmental Analyst

USNG Environmental Compliance

Email: david_keatley@tcenergy.com

Desk: (304) 357-2443

1700 Maccorkle Ave, SE

5th Floor

Charleston, WV

25314

TC Energy

TCEnergy.com

From: Barron, Sarah K <sarah.k.barron@wv.gov>
Sent: Wednesday, July 23, 2025 11:25 AM
To: David Keatley <david_keatley@tcenergy.com>
Subject: [EXTERNAL] Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Pre-Draft Permit; Columbia Gas Transmission, LLC; Application No. R30-01700162-2025

Barron, Sarah K <sarah.k.barron@wv.gov> Wed, Jul 23, 2025 at 11:24 AM
To: David Keatley <david_keatley@tcenergy.com>

David,

Attached are the Sherwood Compressor Station's pre-draft permit and fact sheet for you to review. Please let me know whether or not you have any questions or comments as soon as practicable but preferably no later than August 6, 2025.

Thanks,
- Sarah

--
Sarah Barron
Engineer Trainee
West Virginia Department of Environmental Protection
Division of Air Quality
(304) 414-1915
sarah.k.barron@wv.gov

2 attachments

DPFactSheet R30-01700162-2025.pdf
340K

DPPermit R30-01700162-2025.pdf
726K

West Virginia Department of Environmental Protection
Division of Air Quality

Fact Sheet

For Draft/Proposed Renewal Permitting Action Under 45CSR30 and Title V of the Clean Air Act

Permit Number: **R30-01700162-2025**
Application Received: **October 30, 2024**
Plant Identification Number: **03-54-01700162**
Permittee: **Columbia Gas Transmission, LLC**
Facility Name: **Sherwood Compressor Station**
Mailing Address: **1700 MacCorkle Avenue SE, Charleston, WV 25314**

Physical Location:	West Union, Doddridge County, West Virginia
UTM Coordinates:	523.0 km Easting • 4,346.7 km Northing • Zone 17
Directions:	From Smithburg, WV, head southwest on Smithbury Street towards Smithton Road and make a left. In approximately 0.5 miles, keep left to continue to County Route 50/22. In approximately 0.2 miles, turn left onto US-50 West and then left onto Snowbird Road. At the end of Snowbird Road, turn right onto Route 18. The compressor station will be on the right in approximately 0.5 miles.

Facility Description

The Sherwood Compressor Station is a transmission compressor station for a natural gas pipeline system. The facility consists of two 7,417-HP Solar Taurus 60 turbines, two 15,427-HP Solar Mars 100 turbines, one 1,175-HP Waukesha VGF-P48GL emergency generator RICE, one 1.5-mmBTU/hr process heater, one 0.80-mmBTU/hr process heater, catalytic heaters with a total maximum design heat input of 2.88 mmBTU/hr, one 2,056-gallon pipeline liquids storage tank, and one 1,000-gallon wastewater storage tank. The facility has the potential to operate twenty-four hours per day for seven days per week and fifty-two weeks per year.
SIC: 4922, NAICS: 486210

Emissions Summary

Plantwide Emissions Summary [Tons per Year]

Regulated Pollutants	Potential Emissions	2024 Actual Emissions
Carbon Monoxide (CO)	240.13	79.78
Nitrogen Oxides (NO_X)	102.13	72.59
Particulate Matter ($PM_{2.5}$)	11.78	2.41
Particulate Matter (PM_{10})	11.78	2.41
Total Particulate Matter (TSP)	11.78	2.41
Sulfur Dioxide (SO_2)	1.28	0.81
Volatile Organic Compounds (VOC)	23.94	13.16

PM_{10} is a component of TSP.

Hazardous Air Pollutants	Potential Emissions	2024 Actual Emissions
Formaldehyde	1.40	0.89
Other HAPs	0.65	--
Total HAPs	2.05	0.89

Some of the above HAPs may be counted as PM or VOCs.

Title V Program Applicability Basis

This facility has the potential to emit 240.13 tpy of Carbon Monoxide and 102.13 tpy of Nitrogen Oxides. Due to this facility's potential to emit over 100 tons per year of criteria pollutant, Columbia Gas Transmission, LLC is required to have an operating permit pursuant to Title V of the Federal Clean Air Act as amended and 45CSR30.

Legal and Factual Basis for Permit Conditions

The State and Federally-enforceable conditions of the Title V Operating Permits are based upon the requirements of the State of West Virginia Operating Permit Rule 45CSR30 for the purposes of Title V of the Federal Clean Air Act and the underlying applicable requirements in other state and federal rules.

This facility has been found to be subject to the following applicable rules:

Federal and State:	45CSR2	Control of Particulate Matter Air Pollution from the Combustion of Fuel in Indirect Heat Exchangers.
	45CSR6	Control of Air Pollution from Combustion of Refuse.
	45CSR11	Standby plans for emergency episodes.
	45CSR13	Requirements for NSR Permits.
	45CSR16	Standards of Performance for New Stationary Sources.
	WV Code § 22-5-4 (a) (15)	The Secretary can request any pertinent information such as annual emission inventory reporting.
	45CSR30	Requirements for Operating Permits.

	45CSR34	Emission Standards for Hazardous Air Pollutants.
	40 C.F.R. Part 60, Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.
	40 C.F.R. Part 60, Subpart KKKK	Standards of Performance for Stationary Combustion Turbines.
	40 C.F.R. 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 and On or Before December 6, 2022.
	40 C.F.R. Part 61	Asbestos inspection and removal.
	40 C.F.R. Part 63, Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.
	40 C.F.R. Part 82, Subpart F	Ozone depleting substances.
State Only:	45CSR4	No objectionable odors.
	45CSR17	To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter.

Each State and Federally-enforceable condition of the Title V Operating Permit references the specific relevant requirements of 45CSR30 or the applicable requirement upon which it is based. Any condition of the Title V permit that is enforceable by the State but is not Federally-enforceable is identified in the Title V permit as such.

The Secretary's authority to require standards under 40 C.F.R. Part 60 (NSPS), 40 C.F.R. Part 61 (NESHAPs), and 40 C.F.R. Part 63 (NESHAPs MACT) is provided in West Virginia Code §§ 22-5-1 *et seq.,* 45CSR16, 45CSR34 and 45CSR30.

Active Permits/Consent Orders

Permit or Consent Order Number	Date of Issuance
R13-3313D	July 2, 2024

Conditions from this facility's Rule 13 permit(s) governing construction-related specifications and timing requirements will not be included in the Title V Operating Permit but will remain independently enforceable under the applicable Rule 13 permit(s). All other conditions from this facility's Rule 13 permit(s) governing the source's operation and compliance have been incorporated into this Title V permit in accordance with the "General Requirement Comparison Table," which may be downloaded from DAQ's website.

Determinations and Justifications

The following revisions have been made to the Title V operating permit:

1. Section 1.0. – Emission Units and Active R13, R14, and R19 Permits

    a. On June 12, 2024 and July 31, 2024, Columbia Gas Transmission, LLC submitted notices that the Solar Mars 100 turbines T3 and T4 were to be replaced with like-kind units. The potential emissions did not change as a result of this replacement, and the turbines remain subject to the applicable requirements of R13-3313D and 40 C.F.R. Part 60 Subpart KKKK.

Operation of the replacement turbine T3 commenced on July 17, 2024, and operation of the replacement turbine T4 commenced on October 9, 2024. Due to these changes, the "year installed" listed in the Emission Units Table was updated to 2024 for the turbines T3 and T4.

b. In accordance with the application for R30-01700162-2025, the design capacity of the pipeline liquids storage tank A1 was corrected from 2,000 gallons to 2,056 gallons. The tank is an insignificant activity and is not subject to any applicable requirements.

c. A 1,000-gallon wastewater storage tank was added to the Emission Units Table (Emission Unit ID: A3, Emission Point ID: A03). The storage tank was placed in service on January 25, 2019. The storage tank has minimal emissions of criteria pollutants and hazardous air pollutants (the potential emissions of VOCs and HAPs are each estimated to be below 0.01 tpy) and is not subject to any applicable requirements. Therefore, the wastewater storage tank is an insignificant activity.

2. Section 3.0. – Facility-Wide Requirements

a. The citation of Condition 3.1.6. was revised to refer to the current version of the WV Code.

b. With the issuance of R30-01700162-2020 (MM02) and (MM03), the requirements of Condition 3.1.9. were reserved. This condition was removed from this operating permit renewal, and the subsequent requirement was relabeled as Condition 3.1.9.

c. The citation of Condition 3.3.1. was revised to refer to the current version of the WV Code.

d. The following has been added to Condition 3.3.1.b.: "If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit shall be revised in accordance with 45CSR§30-6.4. or 45CSR§30-6.5., as applicable."

3. Section 4.0. – Turbines

a. With the issuance of R30-01700162-2020 (MM02) and (MM03), the requirements of Condition 4.1.5. were removed from the permit. In this operating permit renewal, this condition was removed, and the subsequent requirements were relabeled Conditions 4.1.5. to 4.1.7.

4. Section 5.0. – Emergency Generator RICE

a. For a stationary SI ICE to be considered an emergency stationary ICE under 40 C.F.R. Part 60 Subpart JJJJ, the engine must be operated according to the provisions of §60.4243(d). These requirements are included in Condition 5.1.7. of the operating permit and, in accordance with Subpart JJJJ, were updated as follows:

i. The references to emergency demand response were removed.

ii. The requirements of 40 C.F.R. §§60.4243(d)(2)(ii) and (iii) were vacated and, therefore, the reference to these provisions were removed.

b. Condition 5.4.1.a. contains the recordkeeping requirements of 40 C.F.R. §60.4245(a). In paragraph a.3. of this condition, the reference to 40 C.F.R. Part 90 was removed. The provisions of Part 90 were moved to Part 1054, with additional testing and compliance provisions in Parts 1065 and 1068.

c. Condition 5.5.1.b. requires the permittee to submit a copy of each performance test conducted according to 40 C.F.R. §60.4244 within 60 days after the test has been completed. This requirement was updated to include the information that the report must contain for each of the testing methods specified in 40 C.F.R.

§60.4245(d). Additionally, the requirement to submit reports electronically according to 40 C.F.R. §60.4245(f) was added to this condition.

d. The following applicable requirements were added to the operating permit under paragraphs c. to e. of Condition 5.5.1.:

i. Paragraph c. contains the conditional reporting requirements of 40 C.F.R. §60.4245(e), which requires the permittee to submit annual reports for an emergency stationary SI ICE with a maximum engine power greater than 100 HP that is operated for the purpose specified in 40 C.F.R. §60.4243(d)(3)(i) (Condition 5.1.7.c.1. of this operating permit).

ii. Paragraph d. contains the provisions of 40 C.F.R. §60.4245(f), which requires the permittee to submit the results of each performance test within 60 days after completing each test.

iii. Paragraph e. contains the provisions of 40 C.F.R. §60.4245(g), which requires notifications and reports to be submitted electronically via the Compliance and Emissions Data Reporting Interface (CEDRI).

5. Section 7.0. – 40CFR60, Subpart OOOOa Requirements

a. The requirements of Condition 7.1.1. have been updated in accordance with the amendments to 40 C.F.R. §60.5397a.

i. As an alternative to §60.5397a, the permittee may comply with the Subpart OOOOb requirements for the fugitive emissions components in §60.5398b. A reference to these requirements was added to the introductory paragraph of this condition.

ii. The procedures for calibration of monitoring equipment in §60.5397a(c)(8)(iii) were added to this condition under paragraph c.8.iii.

iii. In accordance with §60.5397a(d), the required elements of the fugitive emissions monitoring plan were updated in paragraph d. of this condition.

1. The requirements for a sitemap and a defined observation path were removed from paragraphs d.1. and d.2. of this condition.

2. Paragraph d.1. now specifies that the monitoring plan must include procedures to ensure that all fugitive emissions components are monitored during each survey when optical gas imaging is used to determine fugitive emissions.

3. Paragraphs d.3. and d.4. of the previous operating permit were relabeled as paragraphs d.2. and d.3., respectively.

iv. In paragraphs f.1. and f.2., the deadline to conduct the initial monitoring survey was revised from within 60 days of startup to within 90 days of startup.

v. In paragraph g., the requirements for monitoring surveys were updated in accordance with §60.5397a(g).

1. The phrase “within a company-defined area” was removed from paragraphs g.1. and g.2.

2. The semiannual monitoring surveys required under paragraph g.1. must be conducted at least 4 months apart and no more than 7 months apart.

3. The §60.5397a(g)(5) exception to the requirements of §60.5397a(g)(1) was added to the operating permit under paragraph g.5. Paragraph g.5. of the previous operating permit was relabeled as paragraph g.6.

vi. Paragraph h. contains the repair requirements for identified sources of fugitive emissions. These requirements were revised as follows:

1. Under §§60.5397a(h)(1) and (h)(2), the first attempt at repair must be made no later than 30 calendar days after detection of the fugitive emissions and the repair must be completed no later than 30 calendar days after the first attempt at repair.

2. The delay of repair requirements were revised in accordance with §60.5397a(h)(3).

3. Each identified source of fugitive emissions must be resurveyed to complete the repair according to the requirements in §60.5397a(h)(4).

b. As specified in §60.5415a(h)(2), the phrase "or replace" was removed from Condition 7.1.3.b.

c. Under §60.5370a(b), affected facilities subject to Subpart OOOOa must, at all times, be maintained and operated in a manner consistent with good air pollution control practice for minimizing emissions. This requirement was added to the operating permit as Condition 7.1.4.

d. In accordance with §60.5420a(c)(15), the recordkeeping requirements for the collection of fugitive emissions components were updated in paragraphs a. through d. of Condition 7.4.1. Additionally, the recordkeeping requirements for the alternative fugitive emissions standards §60.5399a and §60.5398b were added to the operating permit as paragraphs e. and f. of this condition.

e. Condition 7.5.1. was revised as follows:

i. In paragraph b. of this condition, the reporting requirements for the collection of fugitive emissions components were updated according to §60.5420a(b)(7).

ii. The electronic reporting requirements of §60.5420a(b)(11) were added to the operating permit as paragraph c. of this condition.

Non-Applicability Determinations

The following requirements have been determined not to be applicable to the subject facility due to the following:

1. **40 C.F.R. Part 60 Subpart Dc** – *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* – The maximum design heat input of each heater is less than 10 mmBTU/hr. Therefore, according to 40 C.F.R. §60.40c(a), this rule does not apply.

2. **40 C.F.R. Part 60 Subpart OOOO** – *Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced After August 23, 2011 and On or Before September 18, 2015* – The equipment at the facility was installed after the applicability date specified in 40 C.F.R. §60.5365. Therefore, this rule does not apply.

3. **40 C.F.R. 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*

a. Except for the turbines T3 and T4, the equipment at the facility was installed prior to the Subpart OOOOb applicability date specified in 40CFR§60.5365b and, therefore, is not subject to this rule.

b. The replacement of the turbines T3 and T4 does not meet the definition of a modification to a compressor station specified in 40CFR§60.5365b(i)(3), and, therefore, the facility is not subject to the Subpart OOOOb provisions for fugitive emissions components at a compressor station.

c. The centrifugal compressors driven by the turbines T3 and T4 were not replaced, and, therefore, the Subpart OOOOb provisions for centrifugal compressor affected facilities are inapplicable.

4. **40 C.F.R. Part 64** – *Compliance Assurance Monitoring* – The emission units at the Sherwood Compressor Station are not operated with any control devices and do not have uncontrolled emissions greater than the Title V major source thresholds. Therefore, per §§64.2(a)(2) and (a)(3), CAM is inapplicable to the emission units listed in Section 1.1. of the operating permit.

Request for Variances or Alternatives
None.

Insignificant Activities
Insignificant emission unit(s) and activities are identified in the Title V application.

Comment Period
Beginning Date:
Ending Date:

Point of Contact
All written comments should be addressed to the following individual and office:

Sarah Barron
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304
304/414-1915
sarah.k.barron@wv.gov

Procedure for Requesting Public Hearing
During the public comment period, any interested person may submit written comments on the draft permit and may request a public hearing, if no public hearing has already been scheduled. A request for public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. The Secretary shall grant such a request for a hearing if he/she concludes that a public hearing is appropriate. Any public hearing shall be held in the general area in which the facility is located.

Response to Comments (Statement of Basis)
Not applicable.

West Virginia Department of Environmental Protection

Harold D. Ward
Cabinet Secretary

Permit to Operate

Pursuant to

Title V

of the Clean Air Act

Issued to:

Columbia Gas Transmission, LLC
Sherwood Compressor Station
R30-01700162-2025

Laura M. Crowder
Director, Division of Air Quality

Issued: [Date of issuance] • *Effective: [Equals issue date plus two weeks]*
Expiration: [5 years after issuance date] • *Renewal Application Due: [6 months prior to expiration]*

Permit Number: **R30-01700162-2025**
Permittee: **Columbia Gas Transmission, LLC**
Facility Name: **Sherwood Compressor Station**
Permittee Mailing Address: **1700 MacCorkle Avenue SE, Charleston, WV 25314**

This permit is issued in accordance with the West Virginia Air Pollution Control Act (West Virginia Code §§ 22-5-1 et seq.) and 45CSR30 - Requirements for Operating Permits. The permittee identified at the above-referenced facility is authorized to operate the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Facility Location:	West Union, Doddridge County, West Virginia
Facility Mailing Address:	2678 Route 18 South, West Union, WV 26456
Telephone Number:	(304) 357-2443
Type of Business Entity:	LLC
Facility Description:	Natural Gas Compressor Station
SIC Codes:	4922
UTM Coordinates:	523.0 km Easting • 4,346.7 km Northing • Zone 17

Permit Writer: Sarah Barron

Any person whose interest may be affected, including, but not necessarily limited to, the applicant and any person who participated in the public comment process, by a permit issued, modified or denied by the Secretary may appeal such action of the Secretary to the Air Quality Board pursuant to article one [§§ 22B-1-1 et seq.], Chapter 22B of the Code of West Virginia. West Virginia Code §22-5-14.

Issuance of this Title V Operating Permit does not supersede or invalidate any existing permits under 45CSR13, 14 or 19, although all applicable requirements from such permits governing the facility's operation and compliance have been incorporated into the Title V Operating Permit.

Table of Contents

1.0 Emission Units and Active R13, R14, and R19 Permits

1.1. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
T1	T01	Solar Taurus 60 Turbine	2019	7,417 HP @ 32°F	None
T2	T02	Solar Taurus 60 Turbine	2019	7,417 HP @ 32°F	None
T3	T03	Solar Mars 100 Turbine	2024	15,427 HP @ 32°F	None
T4	T04	Solar Mars 100 Turbine	2024	15,427 HP @ 32°F	None
G1	G1	Waukesha VGF-P48GL Emergency Generator RICE	2019	1,175 HP	None
HTR1	H1	Process Heater	2019	1.50 MMBTU/hr	None
HTR2	H2	Process Heater	2019	0.80 MMBTU/hr	None
HTR3	SH1	Catalytic Heaters	Varies	2.88 MMBTU/hr (total)	None
A1	A01	Pipeline Liquids Storage Tank	2019	2,056 gal	None
A3	A03	Wastewater Storage Tank	2019	1,000 gal	None

1.2. Active R13, R14, and R19 Permits

The underlying authority for any conditions from R13, R14, and/or R19 permits contained in this operating permit is cited using the original permit number (e.g. R13-1234). The current applicable version of such permit(s) is listed below.

Permit Number	Date of Issuance
R13-3313D	July 2, 2024

2.0 General Conditions

2.1. Definitions

2.1.1. All references to the "West Virginia Air Pollution Control Act" or the "Air Pollution Control Act" mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.

2.1.2. The "Clean Air Act" means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.

2.1.3. "Secretary" means the Secretary of the Department of Environmental Protection or other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45CSR§30-2.39.). The Director of the Division of Air Quality is the Secretary's designated representative for the purposes of this permit.

2.1.4. Unless otherwise specified in a permit condition or underlying rule or regulation, all references to a "rolling yearly total" shall mean the sum of the monthly data, values or parameters being measured, monitored, or recorded, at any given time for the previous twelve (12) consecutive calendar months.

2.2. Acronyms

CAAA	Clean Air Act Amendments	**NSPS**	New Source Performance Standards
CBI	Confidential Business Information	**PM**	Particulate Matter
CEM	Continuous Emission Monitor	**PM_{10}**	Particulate Matter less than 10μm in diameter
CES	Certified Emission Statement	**pph**	Pounds per Hour
C.F.R. *or* CFR	Code of Federal Regulations	**ppm**	Parts per Million
CO	Carbon Monoxide	**PSD**	Prevention of Significant Deterioration
C.S.R. *or* CSR	Codes of State Rules	**psi**	Pounds per Square Inch
DAQ	Division of Air Quality	**SIC**	Standard Industrial Classification
DEP	Department of Environmental Protection	**SIP**	State Implementation Plan
FOIA	Freedom of Information Act	**SO_2**	Sulfur Dioxide
HAP	Hazardous Air Pollutant	**TAP**	Toxic Air Pollutant
HON	Hazardous Organic NESHAP	**TPY**	Tons per Year
HP	Horsepower	**TRS**	Total Reduced Sulfur
lbs/hr *or* lb/hr	Pounds per Hour	**TSP**	Total Suspended Particulate
LDAR	Leak Detection and Repair	**USEPA**	United States Environmental Protection Agency
m	Thousand	**UTM**	Universal Transverse Mercator
MACT	Maximum Achievable Control Technology	**VEE**	Visual Emissions Evaluation
mm	Million	**VOC**	Volatile Organic Compounds
mmBtu/hr	Million British Thermal Units per Hour		
$mmft^3$/hr *or* mmcf/hr	Million Cubic Feet Burned per Hour		
NA *or* N/A	Not Applicable		
NAAQS	National Ambient Air Quality Standards		
NESHAPS	National Emissions Standards for Hazardous Air Pollutants		
NO_x	Nitrogen Oxides		

2.3. Permit Expiration and Renewal

2.3.1. Permit duration. This permit is issued for a fixed term of five (5) years and shall expire on the date specified on the cover of this permit, except as provided in 45CSR§30-6.3.b. and 45CSR§30-6.3.c.
[45CSR§30-5.1.b.]

2.3.2. A permit renewal application is timely if it is submitted at least six (6) months prior to the date of permit expiration.
[45CSR§30-4.1.a.3.]

2.3.3. Permit expiration terminates the source's right to operate unless a timely and complete renewal application has been submitted consistent with 45CSR§30-6.2. and 45CSR§30-4.1.a.3.
[45CSR§30-6.3.b.]

2.3.4. If the Secretary fails to take final action to deny or approve a timely and complete permit application before the end of the term of the previous permit, the permit shall not expire until the renewal permit has been issued or denied, and any permit shield granted for the permit shall continue in effect during that time.
[45CSR§30-6.3.c.]

2.4. Permit Actions

2.4.1. This permit may be modified, revoked, reopened and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.
[45CSR§30-5.1.f.3.]

2.5. Reopening for Cause

2.5.1. This permit shall be reopened and revised under any of the following circumstances:

a. Additional applicable requirements under the Clean Air Act or the Secretary's legislative rules become applicable to a major source with a remaining permit term of three (3) or more years. Such a reopening shall be completed not later than eighteen (18) months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions has been extended pursuant to 45CSR§§30-6.6.a.1.A. or B.

b. Additional requirements (including excess emissions requirements) become applicable to an affected source under Title IV of the Clean Air Act (Acid Deposition Control) or other legislative rules of the Secretary. Upon approval by U.S. EPA, excess emissions offset plans shall be incorporated into the permit.

c. The Secretary or U.S. EPA determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

d. The Secretary or U.S. EPA determines that the permit must be revised or revoked and reissued to assure compliance with the applicable requirements.

[45CSR§30-6.6.a.]

2.6. Administrative Permit Amendments

2.6.1. The permittee may request an administrative permit amendment as defined in and according to the procedures specified in 45CSR§30-6.4.
[45CSR§30-6.4.]

2.7. Minor Permit Modifications

2.7.1. The permittee may request a minor permit modification as defined in and according to the procedures specified in 45CSR§30-6.5.a.
[45CSR§30-6.5.a.]

2.8. Significant Permit Modification

2.8.1. The permittee may request a significant permit modification, in accordance with 45CSR§30-6.5.b., for permit modifications that do not qualify for minor permit modifications or as administrative amendments.
[45CSR§30-6.5.b.]

2.9. Emissions Trading

2.9.1. No permit revision shall be required, under any approved economic incentives, marketable permits, emissions trading, and other similar programs or processes for changes that are provided for in the permit and that are in accordance with all applicable requirements.
[45CSR§30-5.1.h.]

2.10. Off-Permit Changes

2.10.1. Except as provided below, a facility may make any change in its operations or emissions that is not addressed nor prohibited in its permit and which is not considered to be construction nor modification under any rule promulgated by the Secretary without obtaining an amendment or modification of its permit. Such changes shall be subject to the following requirements and restrictions:

a. The change must meet all applicable requirements and may not violate any existing permit term or condition.

b. The permittee must provide a written notice of the change to the Secretary and to U.S. EPA within two (2) business days following the date of the change. Such written notice shall describe each such change, including the date, any change in emissions, pollutants emitted, and any applicable requirement that would apply as a result of the change.

c. The change shall not qualify for the permit shield.

d. The permittee shall keep records describing all changes made at the source that result in emissions of regulated air pollutants, but not otherwise regulated under the permit, and the emissions resulting from those changes.

e. No permittee may make any change subject to any requirement under Title IV of the Clean Air Act (Acid Deposition Control) pursuant to the provisions of 45CSR§30-5.9.

f. No permittee may make any changes which would require preconstruction review under any provision of Title I of the Clean Air Act (including 45CSR14 and 45CSR19) pursuant to the provisions of 45CSR§30-5.9.

[45CSR§30-5.9.]

2.11. Operational Flexibility

2.11.1. The permittee may make changes within the facility as provided by § 502(b)(10) of the Clean Air Act. Such operational flexibility shall be provided in the permit in conformance with the permit application and applicable requirements. No such changes shall be a modification under any rule or any provision of Title I of the Clean Air Act (including 45CSR14 and 45CSR19) promulgated by the Secretary in accordance with Title I of the Clean Air Act and the change shall not result in a level of emissions exceeding the emissions allowable under the permit.
[45CSR§30-5.8]

2.11.2. Before making a change under 45CSR§30-5.8., the permittee shall provide advance written notice to the Secretary and to U.S. EPA, describing the change to be made, the date on which the change will occur, any changes in emissions, and any permit terms and conditions that are affected. The permittee shall thereafter maintain a copy of the notice with the permit, and the Secretary shall place a copy with the permit in the public file. The written notice shall be provided to the Secretary and U.S. EPA at least seven (7) days prior to the date that the change is to be made, except that this period may be shortened or eliminated as necessary for a change that must be implemented more quickly to address unanticipated conditions posing a significant health, safety, or environmental hazard. If less than seven (7) days notice is provided because of a need to respond more quickly to such unanticipated conditions, the permittee shall provide notice to the Secretary and U.S. EPA as soon as possible after learning of the need to make the change.
[45CSR§30-5.8.a.]

2.11.3. The permit shield shall not apply to changes made under 45CSR§30-5.8., except those provided for in 45CSR§30-5.8.d. However, the protection of the permit shield will continue to apply to operations and emissions that are not affected by the change, provided that the permittee complies with the terms and conditions of the permit applicable to such operations and emissions. The permit shield may be reinstated for emissions and operations affected by the change:

a. If subsequent changes cause the facility's operations and emissions to revert to those authorized in the permit and the permittee resumes compliance with the terms and conditions of the permit, or

b. If the permittee obtains final approval of a significant modification to the permit to incorporate the change in the permit.

[45CSR§30-5.8.c.]

2.11.4. "Section 502(b)(10) changes" are changes that contravene an express permit term. Such changes do not include changes that would violate applicable requirements or contravene enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.
[45CSR§30-2.40]

2.12. Reasonably Anticipated Operating Scenarios

2.12.1. The following are terms and conditions for reasonably anticipated operating scenarios identified in this permit.

a. Contemporaneously with making a change from one operating scenario to another, the permittee shall record in a log at the permitted facility a record of the scenario under which it is operating and to document the change in reports submitted pursuant to the terms of this permit and 45CSR30.

b. The permit shield shall extend to all terms and conditions under each such operating scenario; and

c. The terms and conditions of each such alternative scenario shall meet all applicable requirements and the requirements of 45CSR30.

[45CSR§30-5.1.i.]

2.13. Duty to Comply

2.13.1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
[45CSR§30-5.1.f.1.]

2.14. Inspection and Entry

2.14.1. The permittee shall allow any authorized representative of the Secretary, upon the presentation of credentials and other documents as may be required by law, to perform the following:

a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

[45CSR§30-5.3.b.]

2.15. Schedule of Compliance

2.15.1. For sources subject to a compliance schedule, certified progress reports shall be submitted consistent with the applicable schedule of compliance set forth in this permit and 45CSR§30-4.3.h., but at least every six (6) months, and no greater than once a month, and shall include the following:

a. Dates for achieving the activities, milestones, or compliance required in the schedule of compliance, and dates when such activities, milestones or compliance were achieved; and

b. An explanation of why any dates in the schedule of compliance were not or will not be met, and any preventative or corrective measure adopted.

[45CSR§30-5.3.d.]

2.16. Need to Halt or Reduce Activity not a Defense

2.16.1. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in determining penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continued operations.
[45CSR§30-5.1.f.2.]

2.17. Reserved

2.18. Federally-Enforceable Requirements

2.18.1. All terms and conditions in this permit, including any provisions designed to limit a source's potential to emit and excepting those provisions that are specifically designated in the permit as "State-enforceable only", are enforceable by the Secretary, USEPA, and citizens under the Clean Air Act.
[45CSR§30-5.2.a.]

2.18.2. Those provisions specifically designated in the permit as “State-enforceable only” shall become “Federally-enforceable” requirements upon SIP approval by the USEPA.

2.19. Duty to Provide Information

2.19.1. The permittee shall furnish to the Secretary within a reasonable time any information the Secretary may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the Secretary copies of records required to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Secretary along with a claim of confidentiality in accordance with 45CSR31. If confidential information is to be sent to USEPA, the permittee shall directly provide such information to USEPA along with a claim of confidentiality in accordance with 40 C.F.R. Part 2.
[45CSR§30-5.1.f.5.]

2.20. Duty to Supplement and Correct Information

2.20.1. Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.
[45CSR§30-4.2.]

2.21. Permit Shield

2.21.1. Compliance with the conditions of this permit shall be deemed compliance with any applicable requirements as of the date of permit issuance provided that such applicable requirements are included and are specifically identified in this permit or the Secretary has determined that other requirements specifically identified are not applicable to the source and this permit includes such a determination or a concise summary thereof.
[45CSR§30-5.6.a.]

2.21.2. Nothing in this permit shall alter or affect the following:

a. The liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance; or

b. The applicable requirements of the Code of West Virginia and Title IV of the Clean Air Act (Acid Deposition Control), consistent with § 408 (a) of the Clean Air Act.

c. The authority of the Administrator of U.S. EPA to require information under § 114 of the Clean Air Act or to issue emergency orders under § 303 of the Clean Air Act.

[45CSR§30-5.6.c.]

2.22. Credible Evidence

2.22.1. Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defenses otherwise available to the permittee including but not limited to any challenge to the credible evidence rule in the context of any future proceeding.
[45CSR§30-5.3.e.3.B.]

2.23. Severability

2.23.1. The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstance is held invalid by a court of competent jurisdiction, the remaining permit terms and conditions or their application to other circumstances shall remain in full force and effect.
[45CSR§30-5.1.e.]

2.24. Property Rights

2.24.1. This permit does not convey any property rights of any sort or any exclusive privilege.
[45CSR§30-5.1.f.4]

2.25. Acid Deposition Control

2.25.1. Emissions shall not exceed any allowances that the source lawfully holds under Title IV of the Clean Air Act (Acid Deposition Control) or rules of the Secretary promulgated thereunder.

a. No permit revision shall be required for increases in emissions that are authorized by allowances acquired pursuant to the acid deposition control program, provided that such increases do not require a permit revision under any other applicable requirement.

b. No limit shall be placed on the number of allowances held by the source. The source may not, however, use allowances as a defense to noncompliance with any other applicable requirement.

c. Any such allowance shall be accounted for according to the procedures established in rules promulgated under Title IV of the Clean Air Act.

[45CSR§30-5.1.d.]

2.25.2. Where applicable requirements of the Clean Air Act are more stringent than any applicable requirement of regulations promulgated under Title IV of the Clean Air Act (Acid Deposition Control), both provisions shall be incorporated into the permit and shall be enforceable by the Secretary and U. S. EPA.
[45CSR§30-5.1.a.2.]

3.0 Facility-Wide Requirements

3.1. Limitations and Standards

3.1.1. **Open burning.** The open burning of refuse by any person is prohibited except as noted in 45CSR§6-3.1. **[45CSR§6-3.1.]**

3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause or allow any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible. **[45CSR§6-3.2.]**

3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them. **[40 C.F.R. §61.145(b) and 45CSR34]**

3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. **[45CSR§4-3.1 State-Enforceable only.]**

3.1.5. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11. **[45CSR§11-5.2]**

3.1.6. **Emission inventory.** The permittee is responsible for submitting, on an annual basis, an emission inventory in accordance with the submittal requirements of the Division of Air Quality. **[W.Va. Code § 22-5-4(a)(15)]**

3.1.7. **Ozone-depleting substances.** For those facilities performing maintenance, service, repair or disposal of appliances, the permittee shall comply with the standards for recycling and emissions reduction pursuant to 40 C.F.R. Part 82, Subpart F, except as provided for Motor Vehicle Air Conditioners (MVACs) in Subpart B:

a. Persons opening appliances for maintenance, service, repair, or disposal must comply with the prohibitions and required practices pursuant to 40 C.F.R. §§ 82.154 and 82.156.

b. Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to 40 C.F.R. § 82.158.

c. Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to 40 C.F.R. § 82.161.

[40 C.F.R. 82, Subpart F]

3.1.8. **Risk Management Plan.** Should this stationary source, as defined in 40 C.F.R. § 68.3, become subject to Part 68, then the owner or operator shall submit a risk management plan (RMP) by the date specified in 40 C.F.R. § 68.10 and shall certify compliance with the requirements of Part 68 as part of the annual compliance certification as required by 40 C.F.R. Part 70 or 71.
[40 C.F.R. 68]

3.1.9. No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.
[45CSR§17-3.1. (State-enforceable only)]

3.2. Monitoring Requirements

3.2.1. None

3.3. Testing Requirements

3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63, if applicable, in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable.

b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit shall be revised in accordance with 45CSR§30-6.4. or 45CSR§30-6.5. as applicable.

c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing

at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.

d. The permittee shall submit a report of the results of the stack test within 60 days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:

1. The permit or rule evaluated, with the citation number and language.

2. The result of the test for each permit or rule condition.

3. A statement of compliance or non-compliance with each permit or rule condition.

[WV Code §§ 22-5-4(a)(15-16) and 45CSR13]

3.4. Recordkeeping Requirements

3.4.1. **Monitoring information.** The permittee shall keep records of monitoring information that include the following:

a. The date, place as defined in this permit and time of sampling or measurements;

b. The date(s) analyses were performed;

c. The company or entity that performed the analyses;

d. The analytical techniques or methods used;

e. The results of the analyses; and

f. The operating conditions existing at the time of sampling or measurement.

[45CSR§30-5.1.c.2.A.; 45CSR13, R13-3313, Condition 4.1.1.]

3.4.2. **Retention of records.** The permittee shall retain records of all required monitoring data and support information for a period of at least five (5) years from the date of monitoring sample, measurement, report, application, or record creation date. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Where appropriate, records may be maintained in computerized form in lieu of the above records.
[45CSR§30-5.1.c.2.B.]

3.4.3. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken. **[45CSR§30-5.1.c. State-Enforceable only.]**

3.5. Reporting Requirements

3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete. **[45CSR§§30-4.4. *and* 5.1.c.3.D.]**

3.5.2. A permittee may request confidential treatment for the submission of reporting required under 45CSR§30-5.1.c.3. pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31. **[45CSR§30-5.1.c.3.E.]**

3.5.3. Except for the electronic submittal of the annual compliance certification and semi-annual monitoring reports to the DAQ and USEPA as required in 3.5.5 and 3.5.6 below, all notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class or by private carrier with postage prepaid to the address(es), or submitted in electronic format by e-mail as set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

DAQ:

Director
WVDEP
Division of Air Quality
601 57th Street SE
Charleston, WV 25304

US EPA:

Section Chief
U. S. Environmental Protection Agency, Region III
Enforcement and Compliance Assurance Division
Air, RCRA, and Toxics Branch (3ED21)
Four Penn Center
1600 John F. Kennedy Boulevard
Philadelphia, PA 19103-2852

DAQ Compliance and Enforcement[1]:
DEPAirQualityReports@wv.gov

[1]For all self-monitoring reports (MACT, GACT, NSPS, etc.), stack tests and protocols, Notice of Compliance Status reports, Initial Notifications, etc.

3.5.4. **Fees.** The permittee shall pay fees on an annual basis in accordance with 45CSR§30-8. **[45CSR§30-8.]**

3.5.5. **Compliance certification.** The permittee shall certify compliance with the conditions of this permit on the forms provided by the DAQ. In addition to the annual compliance certification, the permittee may be required to submit certifications more frequently under an applicable requirement of this permit. The annual certification shall be submitted to the DAQ and USEPA on or before March 15 of each year, and shall certify compliance for the period ending December 31. The permittee shall maintain a copy of the certification on

site for five (5) years from submittal of the certification. The annual certification shall be submitted in electronic format by e-mail to the following addresses:

DAQ:	**US EPA:**
DEPAirQualityReports@wv.gov	R3_APD_Permits@epa.gov

[45CSR§30-5.3.e.]

3.5.6. **Semi-annual monitoring reports.** The permittee shall submit reports of any required monitoring on or before September 15 for the reporting period January 1 to June 30 and on or before March 15 for the reporting period July 1 to December 31. All instances of deviation from permit requirements must be clearly identified in such reports. All required reports must be certified by a responsible official consistent with 45CSR§30-4.4. The semi-annual monitoring reports shall be submitted in electronic format by e-mail to the following address:

DAQ:
DEPAirQualityReports@wv.gov

[45CSR§30-5.1.c.3.A.]

3.5.7. **Reserved.**

3.5.8. **Deviations.**

a. In addition to monitoring reports required by this permit, the permittee shall promptly submit supplemental reports and notices in accordance with the following:

1. Reserved.

2. Any deviation that poses an imminent and substantial danger to public health, safety, or the environment shall be reported to the Secretary immediately by telephone or email. A written report of such deviation, which shall include the probable cause of such deviation, and any corrective actions or preventative measures taken, shall be submitted by the responsible official within ten (10) days of the deviation.

3. Deviations for which more frequent reporting is required under this permit shall be reported on the more frequent basis.

4. All reports of deviations shall identify the probable cause of the deviation and any corrective actions or preventative measures taken.

[45CSR§30-5.1.c.3.C.]

b. The permittee shall, in the reporting of deviations from permit requirements, including those attributable to upset conditions as defined in this permit, report the probable cause of such deviations and any corrective actions or preventive measures taken in accordance with any rules of the Secretary. **[45CSR§30-5.1.c.3.B.]**

3.5.9. **New applicable requirements.** If any applicable requirement is promulgated during the term of this permit, the permittee will meet such requirements on a timely basis, or in accordance with a more detailed schedule if required by the applicable requirement.
[45CSR§30-4.3.h.1.B.]

3.6. Compliance Plan

3.6.1. None

3.7. Permit Shield

3.7.1. The permittee is hereby granted a permit shield in accordance with 45CSR§30-5.6. The permit shield applies provided the permittee operates in accordance with the information contained within this permit.

3.7.2. The following requirements specifically identified are not applicable to the source based on the determinations set forth below. The permit shield shall apply to the following requirements provided the conditions of the determinations are met.

a. 40CFR60, Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. The maximum design heat input of each heater is less than 10 MMBTU/hr. Therefore, according to 40CFR§60.40c(a), this rule does not apply.

b. 40CFR60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced After August 23, 2011, and On or Before September 18, 2015. The equipment at this facility was installed after the applicability date specified in 40CFR§60.5365. Therefore, this rule does not apply.

4.0 Turbines [emission point ID(s): T01, T02, T03, T04]

4.1. Limitations and Standards

4.1.1. The Solar turbines (T01, T02, T03, T04) shall be operated and maintained in accordance with the manufacturer's recommendations and specifications and in a manner consistent with good operating practices and shall only burn natural gas. Each turbine shall only be fired with pipeline-quality natural gas. **[45CSR13, R13-3313, Condition 5.1.1.]**

4.1.2. Maximum annual emissions from the Solar turbines (T01, T02, T03, T04) shall not exceed the following:

Emission Point ID#	NO_X	CO	VOC	SO_2	PM_{10}	CH_2O
	tons/year					
T01	16.78	38.95	2.13	0.21	1.97	0.21
T02	16.78	38.95	2.13	0.21	1.97	0.21
T03	32.51	78.89	4.16	0.41	3.82	0.41
T04	32.51	78.89	4.16	0.41	3.82	0.41

Compliance with the annual emission limits shall be determined using a twelve-month rolling total. A twelve-month rolling total shall mean the sum of the emissions at any given time during the previous twelve consecutive calendar months.

[45CSR13, R13-3313, Condition 5.1.2.]

4.1.3. Maximum hourly emissions from the Solar Taurus 60 turbines (T01, T02) shall not exceed the following:

Operating Parameter	T01	T02
NO_X		
Full Load @ 32°F	15 ppm_v @ 15% O_2 (3.68 lb/hr)	15 ppm_v @ 15% O_2 (3.68 lb/hr)
Low Temp (<0°F)	10.75 lb/hr	10.75 lb/hr
Low Load (<50%)	8.50 lb/hr	8.50 lb/hr
Startup/Shutdown	1.10 lb/event	1.10 lb/event
CO		
Full Load @ 32°F	25 ppm_v @ 15% O_2 (3.74 lb/hr)	25 ppm_v @ 15% O_2 (3.74 lb/hr)
Low Temp (<0°F)	15.58 lb/hr	15.58 lb/hr
Low Load (<50%)	344.95 lb/hr	344.95 lb/hr
Startup/Shutdown	97.30 lb/event	97.30 lb/event
VOC		
Full Load @ 32°F	5 ppm_v @ 15% O_2 (0.43 lb/hr)	5 ppm_v @ 15% O_2 (0.43 lb/hr)

Operating Parameter	T01	T02
Low Temp (<0°F)	0.89 lb/hr	0.89 lb/hr
Low Load (<50%)	3.94 lb/hr	3.94 lb/hr
Startup/Shutdown	1.12 lb/event	1.12 lb/event
SO_2 (short term emission rate based on 20 gr S/100 scf)		
Full Load @ 32°F	3.90 lb/hr	3.90 lb/hr
PM_{10}		
Full Load @ 32°F	0.45 lb/hr	0.45 lb/hr

[45CSR13, R13-3313, Condition 5.1.3.]

4.1.4. Maximum hourly emissions from the Solar Mars 100 turbines (T03, T04) shall not exceed the following:

Operating Parameter	T03	T04
NO_X		
Full Load @ 32°F	15 ppm_v @ 15% O_2 (7.12 lb/hr)	15 ppm_v @ 15% O_2 (7.12 lb/hr)
Low Temp (<0°F)	21.12 lb/hr	21.12 lb/hr
Low Load (<50%)	16.10 lb/hr	16.10 lb/hr
Startup/Shutdown	3.10 lb/event	3.10 lb/event
CO		
Full Load @ 32°F	25 ppm_v @ 15% O_2 (7.23 lb/hr)	25 ppm_v @ 15% O_2 (7.23 lb/hr)
Low Temp (<0°F)	30.60 lb/hr	30.60 lb/hr
Low Load (<50%)	653.41 lb/hr	653.41 lb/hr
Startup/Shutdown	272.70 lb/event	272.70 lb/event
VOC		
Full Load @ 32°F	5 ppm_v @ 15% O_2 (0.83 lb/hr)	5 ppm_v @ 15% O_2 (0.83 lb/hr)
Low Temp (<0°F)	1.75 lb/hr	1.75 lb/hr
Low Load (<50%)	7.47 lb/hr	7.47 lb/hr
Startup/Shutdown	3.12 lb/event	3.12 lb/event
SO_2 (short term emission rate based on 20 gr S/100 scf)		
Full Load @ 32°F	7.54 lb/hr	7.54 lb/hr
PM_{10}		
Full Load @ 32°F	0.87 lb/hr	0.87 lb/hr

[45CSR13, R13-3313, Condition 5.1.4.]

4.1.5. NO_X emissions from the Solar turbines (T01, T02, T03, T04) shall not exceed 25 ppm at 15% O_2 (or an alternative limit of 150 ng/J of useful output or 1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the emission limit for NO_X is 150 ppm at 15% O_2 (or an alternative limit of 1,100 ng/J of useful output or 8.7 lb/MWh).
[45CSR16; 40CFR§60.4320(a) and Table 1 to 40CFR60, Subpart KKKK; 45CSR13, R13-3313, Condition 5.1.5.]

4.1.6. Emissions of SO_2 shall not exceed 0.060 lb of SO_2/MMBTU heat input. For the purpose of demonstrating compliance with this limit, the permittee shall maintain the Federal Energy Regulatory Commission (FERC) tariff limit on total sulfur content of 20 grains of sulfur per 100 standard cubic feet of natural gas combusted in the turbines.
[45CSR16; 40CFR§60.4330(a)(2) and §60.4365(a); 45CSR13, R13-3313, Condition 5.1.6.]

4.1.7. The permittee must operate and maintain the stationary combustion turbines (T01, T02, T03, T04) in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.
[45CSR16; 40CFR§60.4333(a); 45CSR13, R13-3313, Condition 5.1.7.]

4.2. Monitoring Requirements

4.2.1. None

4.3. Testing Requirements

4.3.1. For the purposes of demonstrating compliance with the NO_X emission standards in permit conditions 4.1.3. and 4.1.4., and 40CFR§60.4320(a), the permittee shall conduct an initial performance test within 60 days after achieving maximum output of each turbine, but no later than 180 days after initial startup. After the initial test, subsequent performance testing shall be conducted annually (no more than 14 months following the previous test) unless the previous results demonstrate that the affected units achieved compliance of less than or equal to 75 percent of the NO_X emission limit, then the permittee may reduce the frequency of subsequent tests to once every two years (no more than 26 calendar months following the previous test) as allowed under 40CFR§60.4340(a). If the results of any subsequent performance test exceed 75 percent of the NO_X emission limit, then the permittee must resume annual performance tests. Such testing shall be conducted in accordance with Condition 3.3.1. and 40CFR§60.4400. Records of such testing shall be maintained in accordance with Condition 3.4.2.
[45CSR16; 40CFR§60.8(a), §60.4340(a), and §60.4400; 45CSR13, R13-3313, Condition 5.2.1.]

4.3.2. In order to show compliance with the CO emission limits contained in 4.1.2. – 4.1.4. of this permit, the permittee shall perform performance tests using EPA approved methods (or other alternative methods approved by the Director) as requested by the Secretary and outlined in Section 3.3. Said testing shall be performed while the turbines are operating at normal conditions, within 25% of full load or at the highest achievable load (and while ambient temperatures are above 0°F).
[45CSR13, R13-3313, Condition 5.2.2.]

4.4. Recordkeeping Requirements

4.4.1. To demonstrate compliance with section 4.1.2. – 4.1.4., the permittee shall maintain records of the amount of natural gas consumed and the hours of operation of each of the Solar turbines (T01, T02, T03, T04).
[45CSR13, R13-3313, Condition 5.3.1.]

4.4.2. The permittee shall maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet, has potential sulfur emissions of less than 26 ng SO_2/J (0.060 lb SO_2/MMBTU) heat input for continental areas.
[45CSR16; 40CFR§60.4365(a); 45CSR13, R13-3313, Condition 5.3.2.]

4.4.3. In order to demonstrate compliance with the emission limitations of conditions 4.1.2. – 4.1.4. of this permit, the permittee will monitor and record the monthly operating hours for each operating parameter listed in permit conditions 4.1.3. and 4.1.4. Monthly emissions for each pollutant will be calculated using the following equation:

$$MEP_X = DLNP_X \times DLN\ hrs + LLP_X \times LL\ hrs + LTP_X \times LT\ hrs + SSP_X \times SS\ cycles$$

Where:

- MEP_X is the monthly emissions for each pollutant
- $DLNP_X$ is the unit emission rates (lb/hr) for pollutant X during normal (DLN) operation
- LLP_X is the unit emission rates (lb/hr) for pollutant X during low-load (LL) operation
- LTP_X is the unit emission rates (lb/hr) for pollutant X during low-temperature (LT) operation
- SSP_X is the unit emission rates (lb/cycle) for pollutant X during startup/shutdown (SS) operation

At the end of each month, the monthly emissions will be summed for the preceding 12 months to determine compliance with the annual emissions limits.

[45CSR13, R13-3313, Condition 5.3.3.]

4.5. Reporting Requirements

4.5.1. The permittee shall submit a notification to the Director of the initial startup of the turbines. Such notice must be submitted within 15 days after the actual date of startup for the affected source. This notification supersedes the notification requirements of Condition 2.18. of R13-3313.
[45CSR16; 40CFR§60.7(a)(3); 45CSR13, R13-3313, Condition 5.4.1.]

4.5.2. The permittee shall submit a written report of the results of testing required in 4.3. of this permit before the close of business on the 60th day following the completion of such testing to the Director. Such report(s) shall include all records and readings taken during such testing, as appropriate for the required report.
[45CSR16; 40CFR§60.4375(b); 45CSR13, R13-3313, Condition 5.4.2.]

4.6. Compliance Plan

4.6.1. None

5.0 Emergency Generator RICE [emission point ID(s): G1]

5.1. Limitations and Standards

5.1.1. **Maximum Yearly Operation Limitation.** The maximum yearly operating hours of the 1,175 HP natural gas fired reciprocating engine, Waukesha VGF-P48GL (G1) shall not exceed 500 hours per year (during periods of non-emergencies). Compliance with the Maximum Yearly Operation Limitation shall be determined using a twelve-month rolling total. A twelve-month rolling total shall mean the sum of the hours of operation at any given time during the previous twelve consecutive calendar months.
[45CSR13, R13-3313, Condition 6.1.1.]

5.1.2. Maximum emissions from the 1,175 HP natural gas fired reciprocating engine, Waukesha VGF-P48GL (G1) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	5.18	1.30
Carbon Monoxide	10.36	2.59
Volatile Organic Compounds	3.20	0.80

The emergency generator shall only be fired with pipeline-quality natural gas.

Compliance with these limits ensure compliance with condition 5.1.3.

[45CSR13, R13-3313, Condition 6.1.2.]

5.1.3. Emissions from emergency generator (G1) shall not exceed the following:

a. NO_X emissions from the engine shall not exceed 2.0 grams of NO_X per horsepower-hour (g/HP-hr) or 160 ppmvd at 15 percent O_2;

b. CO emissions from the engine shall not exceed 4.0 g/HP-hr or 540 ppmvd at 15 percent O_2;

c. VOC emissions from the engine shall not exceed 1.0 g/HP-hr or 86 ppmvd at 15 percent O_2. Emissions of formaldehyde shall be excluded when determining compliance with this VOC limit.

[45CSR16; 40CFR§60.4233(e); Table 1 to 40CFR60, Subpart JJJJ; 45CSR13, R13-3313, Condition 6.2.1.]

5.1.4. Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in 40CFR§60.4233 over the entire life of the engine.
[45CSR16; 40CFR§60.4234; 45CSR13, R13-3313, Condition 6.2.2.]

5.1.5. Starting on July 1, 2010, if the emergency stationary SI internal combustion engine that is greater than or equal to 500 HP that was built on or after July 1, 2010, does not meet the standards applicable to non-emergency engines, the owner or operator must install a non-resettable hour meter.
[45CSR16; 40CFR§60.4237(a); 45CSR13, R13-3313, Condition 6.3.1.]

5.1.6. The owner or operator of a stationary SI internal combustion engine that must comply with the emission standards specified in 40CFR§60.4233(d) or (e) must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2) of 40CFR§60.4243.

a. Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in 40CFR§60.4233(d) or (e) and according to the requirements specified in 40CFR§60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of 40CFR§60.4243.

1. The owner or operator of a stationary SI internal combustion engine greater than 500 HP must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the owner or operator must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

[45CSR16; 40CFR§§60.4243(b)(2) and (b)(2)(ii); 45CSR13, R13-3313, Condition 6.4.1.]

5.1.7. The owner or operator of an emergency stationary ICE must operate the emergency stationary ICE according to the requirements in paragraphs (d)(1) through (3) of 40CFR§60.4243. In order for the engine to be considered an emergency stationary ICE under 40CFR60, Subpart JJJJ, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (d)(1) through (3) of 40CFR§60.4243, is prohibited. If the engine is not operated according to the requirements in paragraphs (d)(1) through (3) of 40CFR§60.4243, the engine will not be considered an emergency engine under 40CFR60, Subpart JJJJ and must meet all requirements for non-emergency engines.

a. There is no time limit on the use of emergency stationary ICE in emergency situations.

b. The permittee may operate the emergency stationary ICE for the purpose specified in paragraph (d)(2)(i) of 40CFR§60.4243 for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (d)(3) of 40CFR§60.4243 counts as part of the 100 hours per calendar year allowed by paragraph (d)(2) of 40CFR§60.4243.

1. Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.

c. Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in paragraph (d)(2) of 40CFR§60.4243. Except as provided in paragraph (d)(3)(i) of 40CFR§60.4243, the 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

1. The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

   i. The engine is dispatched by the local balancing authority or local transmission and distribution system operator;

   ii. The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

   iii. The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

   iv. The power is provided only to the facility itself or to support the local transmission and distribution system.

   v. The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

[45CSR16; 40CFR§60.4243(d); 45CSR13, R13-3313, Condition 6.4.2.]

5.1.8. Owners and operators of stationary SI natural gas fired engines may operate their engines using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but must keep records of such use. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the owners and operators are required to conduct a performance test to demonstrate compliance with the emission standards of 40CFR§60.4233.
[45CSR16; 40CFR§60.4243(e); 45CSR13, R13-3313, Condition 6.4.3.]

5.1.9. **40CFR63, Subpart ZZZZ**
The emergency generator (G1) is subject to all applicable regulations given under 40CFR63, Subpart ZZZZ including the following:

a. *Stationary RICE subject to Regulations under 40CFR60*. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of 40CFR§63.6590 must meet the requirements of 40CFR63 by meeting the requirements of 40CFR60, Subpart IIII, for compression ignition engines or 40CFR60, Subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under 40CFR63.

[45CSR34; 40CFR§63.6590(c)]

5.2. Monitoring Requirements

5.2.1. None

5.3. Testing Requirements

5.3.1. Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of 40CFR§60.4244.

a. Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in 40CFR§60.8 and under the specific conditions that are specified by Table 2 to 40CFR60, Subpart JJJJ.

b. The permittee may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in 40CFR§60.8(c). If the stationary SI internal combustion engine is non-operational, the permittee does not need to startup the engine solely to conduct a performance test; however, the permittee must conduct the performance test immediately upon startup of the engine.

c. The permittee must conduct three separate test runs for each performance test required in 40CFR60, Subpart JJJJ, as specified in 40CFR§60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.

d. To determine compliance with the NO_X mass per unit output emission limitation, convert the concentration of NO_X in the engine exhaust using Equation 1 of 40CFR§60.4244:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP-hr} \quad \text{Eq.1}$$

Where:

ER = Emission rate of NO_X in g/HP-hr.

C_d = Measured NO_X concentration in parts per million by volume (ppmv).

1.912×10^{-3} = Conversion constant for ppm NO_X to grams per standard cubic meter at 20°C.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

e. To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of 40CFR§60.4244:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP-hr} \quad \text{Eq. 2}$$

Where:

ER = Emission rate of CO in g/HP-hr.

C_d = Measured CO concentration in ppmv.

1.164×10^{-3} = Conversion constant for ppm CO to grams per standard cubic meter at 20°C.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

f. For the purposes of 40CFR60, Subpart JJJJ, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of 40CFR§60.4244:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP-hr} \quad \text{Eq. 3}$$

Where:

ER = Emission rate of VOC in g/HP-hr.

C_d = VOC concentration measured as propane in ppmv.

1.833×10^{-3} = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20°C.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

g. If the owner/operator chooses to measure VOC emissions using either Method 18 of 40CFR60, appendix A, or Method 320 of 40CFR63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of 40CFR§60.4244. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of 40CFR§60.4244.

$$RF_i = \frac{C_{Mi}}{C_{Ai}} \quad \text{Eq. 4}$$

Where:

RF_i = Response factor of compound i when measured with EPA Method 25A.

C_{Mi} = Measured concentration of compound i in ppmv as carbon.

C_{Ai} = True concentration of compound i in ppmv as carbon.

$$C_{icorr} = RF_i \times C_{imeas}$$ Eq. 5

Where:

C_{icorr} = Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

C_{imeas} = Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{Peq} = 0.6098 \times C_{icorr}$$ Eq. 6

C_{Peq} = Concentration of compound i in mg of propane equivalent per DSCM.

[45CSR16; 40CFR§60.4244; 45CSR13, R13-3313, Condition 6.5.1.]

5.4. Recordkeeping Requirements

5.4.1. Owners or operators of stationary SI ICE must meet the following recordkeeping requirements:

a. Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of 40CFR§60.4245.

1. All notifications submitted to comply with 40CFR60, Subpart JJJJ and all documentation supporting any notification.

2. Maintenance conducted on the engine.

3. If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 1048, 1054, and 1060, as applicable.

4. If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to 40CFR§60.4243(a)(2), documentation that the engine meets the emission standards.

[45CSR16; 40CFR§60.4245(a)]

b. For all stationary SI emergency ICE greater than or equal to 500 HP manufactured on or after July 1, 2010, that do not meet the standards applicable to non-emergency engines, the owner or operator must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation.

[45CSR16; 40CFR§60.4245(b)]

[45CSR13, R13-3313, Conditions 6.6.1.a. and 6.6.1.b.]

5.5. Reporting Requirements

5.5.1. Owners or operators of stationary SI ICE must meet the following notification and reporting requirements:

a. Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in 40CFR§60.4231 must submit an initial notification as required in 40CFR§60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of 40CFR§60.4245. Beginning on February 26, 2025, submit the notification electronically according to 40CFR§60.4245(g).

1. Name and address of the owner or operator;

2. The address of the affected source;

3. Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

4. Emission control equipment; and

5. Fuel used.

[45CSR16; 40CFR§60.4245(c); 45CSR13, R13-3313, Condition 6.6.1.c.]

b. Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in 40CFR§60.4244 within 60 days after the test has been completed. Performance test reports using EPA Method 18, EPA Method 320, or ASTM D6348-03 (incorporated by reference – see 40CFR§60.17) to measure VOC require reporting of all QA/QC data. For Method 18, report results from sections 8.4 and 11.1.1.4; for Method 320, report results from sections 8.6.2, 9.0, and 13.0; and for ASTM D6348-03 report results of all QA/QC procedures in Annexes 1-7. Beginning on February 26, 2025, performance tests must be reported electronically according to 40CFR§60.4245(f).

[45CSR16; 40CFR§60.4245(d); 45CSR13, R13-3313, Condition 6.6.1.d.]

c. For an emergency stationary SI ICE with a maximum engine power more than 100 HP that operates for the purpose specified in 40CFR§60.4243(d)(3)(i), the permittee must submit an annual report according to the requirements in paragraphs (e)(1) through (3) of 40CFR§60.4245.

1. The report must contain the following information:

i. Company name and address where the engine is located.

ii. Date of the report and beginning and ending dates of the reporting period.

iii. Engine site rating and model year.

iv. Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

v. Hours spent for operation for the purposes specified in 40CFR§60.4243(d)(3)(i), including the date, start time, and end time for engine operation for the purposes specified in

40CFR§60.4243(d)(3)(i). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

2. Annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

3. The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (https://cdx.epa.gov/). However, if the reporting form specific to 40CFR60, Subpart JJJJ is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in 40CFR§60.4. Beginning on February 26, 2025, submit the annual report electronically according to paragraph (g) of 40CFR§60.4245.

[45CSR16; 40CFR§60.4245(e)]

d. Beginning on February 26, 2025, within 60 days after the date of completing each performance test, the permittee must submit the results following the procedures specified in paragraph (g) of 40CFR§60.4245. Data collected using test methods that are supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT website (https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert) at the time of the test must be submitted in a file format generated using the EPA's ERT. Alternatively, the permittee may submit an electronic file consistent with the extensible markup language (XML) schema listed on the EPA's ERT website. Data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT website at the time of the test must be included as an attachment in the ERT or an alternate electronic file.

[45CSR16; 40CFR§60.4245(f)]

e. The permittee must submit notifications or reports to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI), which can be accessed through the EPA's Central Data Exchange (CDX) (https://cdx.epa.gov/). The EPA will make all the information submitted through CEDRI available to the public without further notice. Do not use CEDRI to submit information claimed as CBI.

[45CSR16; 40CFR§60.4245(g)]

5.6. Compliance Plan

5.6.1. None

6.0 Heaters [emission point ID(s): H1, H2, SH1]

6.1. Limitations and Standards

6.1.1. Maximum Design Heat Input (MDHI). The MDHI for the heaters shall not exceed the following:

Emission Unit ID#	Emission Unit Description	MDHI
HTR1	Process Heater	1.50 MMBTU/hr
HTR2	Process Heater	0.80 MMBTU/hr
HTR3	Catalytic Heaters	2.88 MMBTU/hr TOTAL

Each heater shall only be fired with pipeline-quality natural gas.

[45CSR13, R13-3313, Condition 7.1.1.]

6.1.2. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six-minute block average. **[45CSR§2-3.1.; 45CSR13, R13-3313, Condition 7.1.2.] (HTR1 & HTR2 Only)**

6.2. Monitoring Requirements

6.2.1. At such reasonable times as the Secretary may designate, the permittee shall conduct Method 9 emission observations for the purpose of demonstrating compliance with permit condition 6.1.2. Method 9 shall be conducted in accordance with 40CFR60, appendix A.
[45CSR13, R13-3313, Condition 7.2.1.]

6.3. Testing Requirements

6.3.1. Upon request by the Secretary, compliance with the visible emission requirements of permit condition 6.1.2. shall be determined in accordance with 40CFR60, appendix A, Method 9 or by using measurements from continuous opacity monitoring systems approved by the Secretary. The Secretary may require the installation, calibration, maintenance and operation of continuous opacity monitoring systems and may establish policies for the evaluation of continuous opacity monitoring results and the determination of compliance with the visible emission requirements of permit condition 6.1.2. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control.
[45CSR§2-3.2.; 45CSR13, R13-3313, Condition 7.3.1.]

6.4. Recordkeeping Requirements

6.4.1. The permittee shall maintain records of all monitoring data required by permit condition 6.2.1. documenting the date and time of each visible emission check, the emission point or equipment/source identification number, the name or means of identification of the observer, the results of the check(s), whether the visible emissions are normal for the process, and, if applicable, all corrective measures taken or planned. The permittee shall also record the general weather conditions (i.e. sunny, approximately 80°F, 6-10 mph NE wind) during the visual emission check(s). Should a visible emission observation be required to be performed per the requirements specified in Method 9, the data records of each observation shall be maintained per the requirements of Method 9.
[45CSR13, R13-3313, Condition 7.4.1.]

6.5. Reporting Requirements

6.5.1. None

6.6. Compliance Plan

6.6.1. None

7.0 40CFR60, Subpart OOOOa Requirements

7.1. Limitations and Standards

7.1.1. For each affected facility under 40CFR§60.5365a(j), the permittee must reduce GHG (in the form of a limitation on emissions of methane) and VOC emissions by complying with the requirements of paragraphs (a) through (j) of 40CFR§60.5397a. The requirements in this section are independent of the closed vent system and cover requirements in 40CFR§60.5411a. Alternatively, the permittee may comply with the requirements of 40CFR§60.5398b, including the notification, recordkeeping, and reporting requirements outlined in 40CFR§60.5424b. For the purpose of Subpart OOOOa, compliance with the requirements of 40CFR§60.5398b will be deemed compliance with this section. When complying with 40CFR§60.5398b, the definitions in 40CFR§60.5430b shall apply for those activities conducted under 40CFR§60.5398b.

a. The permittee must monitor all fugitive emission components, as defined in 40CFR§60.5430a, in accordance with 40CFR§§60.5397a(b) through (g). The permittee must repair all sources of fugitive emissions in accordance with 40CFR§60.5397a(h). The permittee must keep records in accordance with 40CFR§60.5397a(i) and report in accordance with 40CFR§60.5397a(j). For purposes of this section, fugitive emissions are defined as any visible emission from a fugitive emissions component observed using optical gas imaging or an instrument reading of 500 parts per million (ppm) or greater using Method 21 of appendix A-7 to 40CFR60.

b. The permittee must develop an emissions monitoring plan that covers the collection of fugitive emissions components at well sites and compressor stations within each company-defined area in accordance with 40CFR§§60.5397a(c) and (d).

c. Fugitive emissions monitoring plans must include the elements specified in 40CFR§§60.5397a(c)(1) through (8), at a minimum.

1. Frequency for conducting surveys. Surveys must be conducted at least as frequently as required by 40CFR§§60.5397a(f) and (g).

2. Technique for determining fugitive emissions (i.e., Method 21 of appendix A-7 to 40CFR60 or optical gas imaging meeting the requirements in 40CFR§§60.5397a(c)(7)(i) through (vii)).

3. Manufacturer and model number of fugitive emissions detection equipment to be used.

4. Procedures and timeframes for identifying and repairing fugitive emissions components from which fugitive emissions are detected, including timeframes for fugitive emission components that are unsafe to repair. The repair schedule must meet the requirements of 40CFR§60.5397a(h) at a minimum.

5. Procedures and timeframes for verifying fugitive emission component repairs.

6. Records that will be kept and the length of time records will be kept.

7. If using optical gas imaging, the plan must also include the elements specified in 40CFR§§60.5397a(c)(7)(i) through (vii).

i. Verification that the optical gas imaging equipment meets the specifications of 40CFR§§60.5397a(c)(7)(i)(A) and (B). This verification is an initial verification and may

either be performed by the facility, by the manufacturer, or by a third party. For the purposes of complying with the fugitive emissions monitoring program with optical gas imaging, a fugitive emission is defined as any visible emissions observed using optical gas imaging.

A. The optical gas imaging equipment must be capable of imaging gases in the spectral range for the compound of highest concentration in the potential fugitive emissions.

B. The optical gas imaging equipment must be capable of imaging a gas that is half methane, half propane at a concentration of 10,000 ppm at a flow rate of ≤60g/hr from a quarter inch diameter orifice.

ii. Procedure for a daily verification check.

iii. Procedure for determining the operator's maximum viewing distance from the equipment and how the operator will ensure that this distance is maintained.

iv. Procedure for determining maximum wind speed during which monitoring can be performed and how the operator will ensure monitoring occurs only at wind speeds below this threshold.

v. Procedures for conducting surveys, including the items specified in 40CFR§§60.5397a(c)(7)(v)(A) through (C).

A. How the operator will ensure an adequate thermal background is present in order to view potential fugitive emissions.

B. How the operator will deal with adverse monitoring conditions, such as wind.

C. How the operator will deal with interferences (e.g., steam).

vi. Training and experience needed prior to performing surveys.

vii. Procedures for calibration and maintenance. At a minimum, procedures must comply with those recommended by the manufacturer.

8. If using Method 21 of appendix A-7 of 40CFR60, the plan must also include the elements specified in 40CFR§§60.5397a(c)(8)(i) through (iii). For the purposes of complying with the fugitive emissions monitoring program using Method 21 of appendix A-7 of 40CFR60, a fugitive emission is defined as an instrument reading of 500 ppm or greater.

i. Verification that the monitoring equipment meets the requirements specified in Section 6.0 of Method 21 at 40CFR60, appendix A-7. For purposes of instrument capability, the fugitive emissions definition shall be 500 ppm or greater methane using a FID-based instrument. If the permittee wishes to use an analyzer other than a FID-based instrument, the permittee must develop a site-specific fugitive emission definition that would be equivalent to 500 ppm methane using a FID-based instrument (e.g., 10.6 eV PID with a specified isobutylene concentration as the fugitive emission definition would provide equivalent response to the compound of interest).

ii. Procedures for conducting surveys. At a minimum, the procedures shall ensure that the surveys comply with the relevant sections of Method 21 at 40CFR60, appendix A-7, including Section 8.3.1.

iii. Procedures for calibration. The instrument must be calibrated before use each day of its use by the procedures specified in Method 21 of appendix A-7 of 40CFR60. At a minimum, the permittee must also conduct precision tests at the interval specified in Method 21 of appendix A-7 of 40CFR60, Section 8.1.2, and a calibration drift assessment at the end of each monitoring day. The calibration drift assessment must be conducted as specified in 40CFR§60.5397a(c)(8)(iii)(A). Corrective action for drift assessments is specified in 40CFR§§60.5397a(c)(8)(iii)(B) and (C).

A. Check the instrument using the same calibration gas that was used to calibrate the instrument before use. Follow the procedures specified in Method 21 of appendix A-7 of 40CFR60, Section 10.1, except do not adjust the meter readout to correspond to the calibration gas value. If multiple scales are used, record the instrument reading for each scale used. Divide the arithmetic difference of the initial and post-test calibration response by the corresponding calibration gas value for each scale and multiply by 100 to express the calibration drift as a percentage.

B. If a calibration drift assessment shows a negative drift of more than 10 percent, then all equipment with instrument readings between the fugitive emission definition multiplied by (100 minus the percent of negative drift/divided by 100) and the fugitive emission definition that was monitored since the last calibration must be re-monitored.

C. If any calibration drift assessment shows a positive drift of more than 10 percent from the initial calibration value, then, at the owner/operator's discretion, all equipment with instrument readings above the fugitive emission definition and below the fugitive emission definition multiplied by (100 plus the percent of positive drift/divided by 100) monitored since the last calibration may be re-monitored.

d. Each fugitive emissions monitoring plan must include the elements specified in 40CFR§§60.5397a(d)(1) through (3), at a minimum, as applicable.

1. If the permittee is using optical gas imaging, the plan must include procedures to ensure that all fugitive emissions components are monitored during each survey. Example procedures include, but are not limited to, a sitemap with an observation path, a written narrative of where the fugitive emissions components are located and how they will be monitored, or an inventory of fugitive emissions components.

2. If the permittee is using Method 21 of appendix A-7 of 40CFR60, the plan must include a list of fugitive emissions components to be monitored and method for determining the location of fugitive emissions components to be monitored in the field (e.g., tagging, identification on a process and instrumentation diagram, etc.).

3. The fugitive emissions monitoring plan must include the written plan developed for all of the fugitive emissions components designated as difficult-to-monitor in accordance with 40CFR§60.5397a(g)(3), and the written plan for fugitive emissions components designated as unsafe-to-monitor in accordance with 40CFR§60.5397a(g)(4).

e. Each monitoring survey shall observe each fugitive emissions component, as defined in 40CFR§60.5430a, for fugitive emissions.

f. 1. The permittee must conduct an initial monitoring survey within 90 days of the startup of production, as defined in 40CFR§60.5430a, for each collection of fugitive emissions components at a new well site or by June 3, 2017, whichever is later. For a modified collection of fugitive emissions components at a well site, the initial monitoring survey must be conducted within 90 days of the startup of production for each collection of fugitive emissions components after the modification or by June 3, 2017, whichever is later.

2. The permittee must conduct an initial monitoring survey within 90 days of the startup of a new compressor station for each collection of fugitive emissions components at the new compressor station or by June 3, 2017, whichever is later. For a modified collection of fugitive emissions components at a compressor station, the initial monitoring survey must be conducted within 90 days of the modification or by June 3, 2017, whichever is later.

g. A monitoring survey of each collection of fugitive emissions components at a well site or at a compressor station must be performed at the frequencies specified in 40CFR§§60.5397a(g)(1) and (2), with the exceptions noted in 40CFR§§60.5397a(g)(3) through (6).

1. A monitoring survey of each collection of fugitive emissions components at a well site must be conducted at least semiannually after the initial survey. Consecutive semiannual monitoring surveys must be conducted at least 4 months apart and no more than 7 months apart.

2. A monitoring survey of the collection of fugitive emissions components at a compressor station must be conducted at least quarterly after the initial survey. Consecutive quarterly monitoring surveys must be conducted at least 60 days apart.

3. Fugitive emissions components that cannot be monitored without elevating the monitoring personnel more than 2 meters above the surface may be designated as difficult-to-monitor. Fugitive emissions components that are designated difficult-to-monitor must meet the specifications of 40CFR§§60.5397a(g)(3)(i) through (iv).

i. A written plan must be developed for all of the fugitive emissions components designated difficult-to-monitor. This written plan must be incorporated into the fugitive emissions monitoring plan required by 40CFR§§60.5397a(b), (c), and (d).

ii. The plan must include the identification and location of each fugitive emissions component designated as difficult-to-monitor.

iii. The plan must include an explanation of why each fugitive emissions component designated as difficult-to-monitor is difficult-to-monitor.

iv. The plan must include a schedule for monitoring the difficult-to-monitor fugitive emissions components at least once per calendar year.

4. Fugitive emissions components that cannot be monitored because monitoring personnel would be exposed to immediate danger while conducting a monitoring survey may be designated as unsafe-to-monitor. Fugitive emissions components that are designated unsafe-to-monitor must meet the specifications of 40CFR§§60.5397a(g)(4)(i) through (iv).

    i. A written plan must be developed for all of the fugitive emissions components designated unsafe-to-monitor. This written plan must be incorporated into the fugitive emissions monitoring plan required by 40CFR§§60.5397a(b), (c), and (d).

    ii. The plan must include the identification and location of each fugitive emissions component designated as unsafe-to-monitor.

    iii. The plan must include an explanation of why each fugitive emissions component designated as unsafe-to-monitor is unsafe-to-monitor.

    iv. The plan must include a schedule for monitoring the fugitive emissions components designated as unsafe-to-monitor.

5. The permittee is no longer required to comply with the requirements of 40CFR§60.5397a(g)(1) when the owner or operator removes all major production and processing equipment, as defined in 40CFR§60.5430a, such that the well site becomes a wellhead only well site. If any major production and processing equipment is subsequently added to the well site, then the owner or operator must comply with the requirements in paragraphs (f)(1) and (g)(1) of 40CFR§60.5397a.

6. The requirements of 40CFR§60.5397a(g)(2) are waived for any collection of fugitive emissions components at a compressor station located within an area that has an average calendar month temperature below 0°F for two of three consecutive calendar months of a quarterly monitoring period. The calendar month temperature average for each month within the quarterly monitoring period must be determined using historical monthly average temperatures over the previous three years as reported by a National Oceanic and Atmospheric Administration source or other source approved by the Administrator. The requirements of 40CFR§60.5397a(g)(2) shall not be waived for two consecutive quarterly monitoring periods.

h. Each identified source of fugitive emissions shall be repaired, as defined in 40CFR§60.5430a, in accordance with 40CFR§§60.5397a(h)(1) and (2).

1. A first attempt at repair shall be made no later than 30 calendar days after detection of the fugitive emissions.

2. Repair shall be completed as soon as practicable, but no later than 30 calendar days after the first attempt at repair as required in 40CFR§60.5397a(h)(1).

3. Delay of repair will be allowed if the conditions in 40CFR§60.5397a(h)(3)(i) or (ii) are met.

    i. If the repair is technically infeasible, would require a vent blowdown, a compressor station shutdown, a well shutdown or well shut-in, or would be unsafe to repair during operation of the unit, the repair must be completed during the next scheduled compressor station shutdown for maintenance, scheduled well shutdown, scheduled well shut-in, after a scheduled vent blowdown, or within 2 years of detecting the fugitive emissions, whichever is earliest. For

purposes of 40CFR§60.5397a(h)(3), a vent blowdown is the opening of one or more blowdown valves to depressurize major production and processing equipment, other than a storage vessel.

ii. If the repair requires replacement of a fugitive emissions component or a part thereof, but the replacement cannot be acquired and installed within the repair timelines specified in paragraphs (h)(1) and (2) of 40CFR§60.5397a due to either of the conditions specified in paragraphs (h)(3)(ii)(A) or (B) of 40CFR§60.5397a, the repair must be completed in accordance with paragraph (h)(3)(ii)(C) of 40CFR§60.5397a and documented in accordance with 40CFR§60.5420a(c)(15)(vii)(I).

A. Valve assembly supplies had been sufficiently stocked but are depleted at the time of the required repair.

B. A replacement fugitive emissions component or a part thereof requires custom fabrication.

C. The required replacement must be ordered no later than 10 calendar days after the first attempt at repair. The repair must be completed as soon as practicable, but no later than 30 calendar days after receipt of the replacement component, unless the repair requires a compressor station or well shutdown. If the repair requires a compressor station or well shutdown, the repair must be completed in accordance with the timeframe specified in 40CFR§60.5397a(h)(3)(i).

4. Each identified source of fugitive emissions must be resurveyed to complete repair according to the requirements in 40CFR§§60.5397a(h)(4)(i) through (iv), to ensure that there are no fugitive emissions.

i. The operator may resurvey the fugitive emissions components to verify repair using either Method 21 of appendix A-7 of 40CFR60 or optical gas imaging.

ii. For each repair that cannot be made during the monitoring survey when the fugitive emissions are initially found, a digital photograph must be taken of that component or the component must be tagged during the monitoring survey when the fugitives were initially found for identification purposes and subsequent repair. The digital photograph must include the date that the photograph was taken and must clearly identify the component by location within the site (e.g., the latitude and longitude of the component or by other descriptive landmarks visible in the picture).

iii. Operators that use Method 21 of appendix A-7 of 40CFR60 to resurvey the repaired fugitive emissions components are subject to the resurvey provisions specified in 40CFR§§60.5397a(h)(4)(iii)(A) and (B).

A. A fugitive emissions component is repaired when the Method 21 instrument indicates a concentration of less than 500 ppm above background or when no soap bubbles are observed when the alternative screening procedures specified in section 8.3.3 of Method 21 of appendix A-7 of 40CFR60 are used.

B. Operators must use the Method 21 monitoring requirements specified in 40CFR§60.5397a(c)(8)(ii) or the alternative screening procedures specified in section 8.3.3 of Method 21 of appendix A-7 of 40CFR60.

iv. Operators that use optical gas imaging to resurvey the repaired fugitive emissions components, are subject to the resurvey provisions specified in 40CFR§§60.5397a(h)(4)(iv)(A) and (B).

A. A fugitive emissions component is repaired when the optical gas imaging instrument shows no indication of visible emissions.

B. Operators must use the optical gas imaging monitoring requirements specified in 40CFR§60.5397a(c)(7).

i. Records for each monitoring survey shall be maintained as specified 40CFR§60.5420a(c)(15).

j. Annual reports shall be submitted for each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station that include the information specified in 40CFR§60.5420a(b)(7). Multiple collection of fugitive emissions components at a well site or at a compressor station may be included in a single annual report.

[45CSR16; 40CFR§60.5397a; 45CSR13, R13-3313, Condition 4.1.4.]

7.1.2. The permittee must determine initial compliance with the standards for each affected facility. The initial compliance period begins on August 2, 2016, or upon initial startup, whichever is later, and ends no later than 1 year after the initial startup date for the affected facility or no later than 1 year after August 2, 2016. The initial compliance period may be less than 1 full year.

a. To achieve initial compliance with the fugitive emission standards for each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station, the permittee must comply with paragraphs (j)(1) through (5) of 40CFR§60.5410a.

1. The permittee must develop a fugitive emissions monitoring plan as required in 40CFR§§60.5397a(b), (c), and (d).

2. The permittee must conduct an initial monitoring survey as required in 40CFR§60.5397a(f).

3. The permittee must maintain the records specified in 40CFR§60.5420a(c)(15).

4. The permittee must repair each identified source of fugitive emissions for each affected facility as required in 40CFR§60.5397a(h).

5. The permittee must submit the initial annual report for each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station as required in 40CFR§§60.5420a(b)(1) and (7).

[45CSR16; 40CFR§60.5410a(j)]

7.1.3. For each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station, the permittee must demonstrate continuous compliance with the fugitive emission standards specified in 40CFR§60.5397a(a)(1) according to the following paragraphs:

a. The permittee must conduct periodic monitoring surveys as required in 40CFR§60.5397a(g).

b. The permittee must repair each identified source of fugitive emissions as required in 40CFR§60.5397a(h).

c. The permittee must maintain records as specified in 40CFR§60.5420a(c)(15).

d. The permittee must submit annual reports for collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station as required in 40CFR§§60.5420a(b)(1) and (7).

[45CSR16; 40CFR§60.5415a(h)]

7.1.4. At all times, including periods of startup, shutdown, and malfunction, owners and operators shall maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. The provisions for exemption from compliance during periods of startup, shutdown and malfunctions provided for in 40CFR§60.8(c) do not apply to 40CFR60, Subpart OOOOa.
[45CSR16; 40CFR§60.5370a(b)]

7.2. Monitoring Requirements

7.2.1. None

7.3. Testing Requirements

7.3.1. None

7.4. Recordkeeping Requirements

7.4.1. The permittee must maintain the records identified as specified in §60.7(f) and in paragraphs (c)(1) through (18) of 40CFR§60.5420a. All records required by 40CFR60, Subpart OOOOa must be maintained either onsite or at the nearest local field office for at least 5 years. Any records required to be maintained by 40CFR60, Subpart OOOOa that are submitted electronically via the EPA's CDX may be maintained in electronic format.

For each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station, maintain the records identified in paragraphs (c)(15)(i) through (viii) of 40CFR§60.5420a.

a. The date of the startup of production or the date of the first day of production after modification for each collection of fugitive emissions components at a well site and the date of startup or the date of modification for each collection of fugitive emissions components at a compressor station.

b. For each collection of fugitive emissions components at a well site where the permittee completes the removal of all major production and processing equipment such that the well site contains only one or more wellheads, record the date the well site completes the removal of all major production and processing equipment from the well site, and, if the well site is still producing, record the well ID or

separate tank battery ID receiving the production from the well site. If major production and processing equipment is subsequently added back to the well site, record the date that the first piece of major production and processing equipment is added back to the well site.

c. The fugitive emissions monitoring plan as required in 40CFR§§60.5397a(b), (c), and (d).

d. The records of each monitoring survey as specified in paragraphs (c)(15)(vii)(A) through (I) of 40CFR§60.5420a.

1. Date of the survey.

2. Beginning and end time of the survey.

3. Name of the operator(s), training, and experience of the operator(s) performing the survey.

4. Monitoring instrument used.

5. Fugitive emissions component identification when Method 21 of appendix A-7 of 40CFR60 is used to perform the monitoring survey.

6. Ambient temperature, sky conditions, and maximum wind speed at the time of the survey. For compressor stations, operating mode of each compressor (i.e., operating, standby pressurized, and not operating-depressurized modes) at the station at the time of the survey.

7. Any deviations from the monitoring plan or a statement that there were no deviations from the monitoring plan.

8. Records of calibration for the instrument used during the monitoring survey.

9. Documentation of each fugitive emission detected during the monitoring survey, including the information specified in paragraphs (c)(15)(vii)(I)(1) through (9) of 40CFR§60.5420a.

i. Location of each fugitive emission identified.

ii. Type of fugitive emissions component, including designation as difficult-to-monitor or unsafe-to-monitor, if applicable.

iii. If Method 21 of appendix A-7 of 40CFR60 is used for detection, record the component ID and instrument reading.

iv. For each repair that cannot be made during the monitoring survey when the fugitive emissions are initially found, a digital photograph or video must be taken of that component or the component must be tagged for identification purposes. The digital photograph must include the date that the photograph was taken and must clearly identify the component by location within the site (e.g., the latitude and longitude of the component or by other descriptive landmarks visible in the picture). The digital photograph or identification (e.g., tag) may be removed after the repair is completed, including verification of repair with the resurvey.

v. The date of first attempt at repair of the fugitive emissions component(s).

vi. The date of successful repair of the fugitive emissions component, including the resurvey to verify repair and instrument used for the resurvey.

vii. Identification of each fugitive emissions component placed on delay of repair and explanation for each delay of repair.

viii. For each fugitive emissions component placed on delay of repair for reason of replacement component unavailability, the operator must document: the date the component was added to the delay of repair list, the date the replacement fugitive component or part thereof was ordered, the anticipated component delivery date (including any estimated shipment or delivery date provided by the vendor), and the actual arrival date of the component.

ix. Date of planned shutdowns that occur while there are any components that have been placed on delay of repair.

e. For each collection of fugitive emissions components at a well site or collection of fugitive emissions components at a compressor station complying with an alternative means of emissions limitation under 40CFR§60.5399a, the permittee must maintain the records specified by the specific alternative fugitive emissions standard for a period of at least 5 years.

f. If the permittee complies with the alternative GHG and VOC standard under 40CFR§60.5398b, in lieu of the information specified in paragraphs (c)(15)(vi) through (vii) of 40CFR§60.5420a, the permittee must maintain the records specified in 40CFR§60.5424b.

[45CSR16; 40CFR§§60.5420a(c) and (c)(15)]

7.5. Reporting Requirements

7.5.1. Reporting requirements. The permittee must submit annual reports containing the information specified in paragraphs (b)(1) through (8) and (12) of 40CFR§60.5420a and performance test reports as specified in paragraph (b)(9) or (10) of 40CFR§60.5420a, if applicable. The permittee must submit annual reports following the procedure specified in paragraph (b)(11) of 40CFR§60.5420a. The initial annual report is due no later than 90 days after the end of the initial compliance period as determined according to 40CFR§60.5410a. Subsequent annual reports are due no later than same date each year as the initial annual report. The permittee may submit one report for multiple affected facilities provided the report contains all of the information required as specified in paragraphs (b)(1) through (8) and (12) of 40CFR§60.5420a. Annual reports may coincide with Title V reports as long as all the required elements of the annual report are included. The permittee may arrange with the Administrator a common schedule on which reports required by 40CFR60 may be submitted as long as the schedule does not extend the reporting period.

a. The general information specified in paragraphs (b)(1)(i) through (iv) of 40CFR§60.5420a is required for all reports.

1. The company name, facility site name associated with the affected facility, US Well ID or US Well ID associated with the affected facility, if applicable, and address of the affected facility. If an address is not available for the site, include a description of the site location and provide the latitude and longitude coordinates of the site in decimal degrees to an accuracy and precision of five (5) decimals of a degree using the North American Datum of 1983.

2. An identification of each affected facility being included in the annual report.

3. Beginning and ending dates of the reporting period.

4. A certification by a certifying official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

b. For the collection of fugitive emissions components at each well site and the collection of fugitive emissions components at each compressor station, report the information specified in paragraphs (b)(7)(i) through (iii) of 40CFR§60.5420a, as applicable.

1. i. Designation of type of site (i.e., well site or compressor station) at which the collection of fugitive emissions components is located.

ii. For each collection of fugitive emissions components at a well site that became an affected facility during the reporting period, the permittee must include the date of the startup of production or the date of the first day of production after modification. For each collection of fugitive emissions components at a compressor station that became an affected facility during the reporting period, the permittee must include the date of startup or the date of modification.

iii. For each collection of fugitive emissions components at a well site where during the reporting period the permittee completes the removal of all major production and processing equipment such that the well site contains only one or more wellheads, the permittee must include the date of the change to status as a wellhead only well site.

iv. For each collection of fugitive emissions components at a well site where the permittee previously reported under paragraph (b)(7)(i)(C) of 40CFR§60.5420a the removal of all major production and processing equipment and during the reporting period major production and processing equipment is added back to the well site, the date that the first piece of major production and processing equipment is added back to the well site.

2. For each fugitive emissions monitoring survey performed during the annual reporting period, the information specified in paragraphs (b)(7)(ii)(A) through (G) of 40CFR§60.5420a.

i. Date of the survey.

ii. Monitoring instrument used.

iii. Any deviations from the monitoring plan elements under 40CFR§§60.5397a(c)(1), (2), and (7) and (c)(8)(i) or a statement that there were no deviations from these elements of the monitoring plan.

iv. Number and type of components for which fugitive emissions were detected.

v. Number and type of fugitive emissions components that were not repaired as required in 40CFR§60.5397a(h).

vi. Number and type of fugitive emission components (including designation as difficult-to-monitor or unsafe-to-monitor, if applicable) on delay of repair and explanation for each delay of repair.

vii. Date of planned shutdown(s) that occurred during the reporting period if there are any components that have been placed on delay of repair.

3. For each collection of fugitive emissions components at a well site or collection of fugitive emissions components at a compressor station complying with an alternative fugitive emissions standard under 40CFR§60.5399a, in lieu of the information specified in paragraphs (b)(7)(i) and (ii) of 40CFR§60.5420a, the permittee must provide the information specified in paragraphs (b)(7)(iii)(A) through (C) of 40CFR§60.5420a.

   i. The alternative standard with which the permittee is complying.

   ii. The site-specific reports specified by the specific alternative fugitive emissions standard, submitted in the format in which they were submitted to the state, local, or tribal authority. If the report is in hard copy, the permittee must scan the document and submit it as an electronic attachment to the annual report required in paragraph (b) of 40CFR§60.5420a.

   iii. If the report specified by the specific alternative fugitive emissions standard is not site-specific, the permittee must submit the information specified in paragraphs (b)(7)(i) and (ii) of 40CFR§60.5420a for each individual site complying with the alternative standard.

4. If the permittee complies with the alternative GHG and VOC standard under 40CFR§60.5398b, in lieu of the information specified in paragraph (b)(7)(ii) of 40CFR§60.5420a, the permittee must provide the information specified in 40CFR§60.5424b.

c. The permittee must submit reports to the EPA via CEDRI, except as outlined in 40CFR§60.5420a(b)(11). CEDRI can be accessed through the EPA's CDX (https://cdx.epa.gov/). The permittee must use the appropriate electronic report template on the CEDRI website for 40CFR60, Subpart OOOOa (https://www.epa.gov/electronic-reporting-air-emissions/cedri/). If the reporting form specific to Subpart OOOOa is not available on the CEDRI website at the time that the report is due, the permittee must submit the report to the Administrator at the appropriate address listed in 40CFR§60.4. Once the form has been available in CEDRI for at least 90 calendar days, the permittee must begin submitting all subsequent reports via CEDRI. The date reporting forms become available will be listed on the CEDRI website. Unless the Administrator or delegated state agency or other authority has approved a different schedule for submission of reports, the reports must be submitted by the deadlines specified in Subpart OOOOa, regardless of the method in which the reports are submitted. The EPA will make all the information submitted through CEDRI available to the public without further notice. Do not use CEDRI to submit information claimed as CBI.

[45CSR16; 40CFR§§60.5420a(b), (b)(1), (b)(7), and (b)(11)]

7.6. Compliance Plan

7.6.1. None

Division of Air Quality Permit Application Submittal

Please find attached a permit application for : Columbia Gas Transmission, LLC; Sherwood Compressor Station

[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 017-00162
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R30-01700162-2020 (MM02 and MM03), R13-3313D

- Type of NSR Application (check all that apply):
  - ☐ Construction
  - ☐ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Revision (if any)**:
  - ☐ Title V Initial
  - ☑ Title V Renewal
  - ☐ Administrative Update
  - ☐ Minor Modification
  - ☐ Significant Modification
  - ☐ Off Permit Change

****If any box above is checked, include the Title V revision information as ATTACHMENT S to this application.**

- Payment Type:
  - ☐ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
    - Name:
    - Email:
    - Phone Number:
  - ☑ Company Contact
    - Name: David Keatley
    - Email: david_keatley@tcenergy.com
    - Phone Number: (304) 357-2443
  - ☐ Consultant
    - Name:
    - Email:
    - Phone Number:

Columbia Gas Transmission, LLC

Air Permit Application for Title V Renewal
Sherwood Compressor Station

Sherwood, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Charleston, West Virginia

July 2025

Columbia Gas Transmission, LLC
1700 MacCorkle Avenue SE
Charleston, WV 25314

July 14th, 2025

Laura M. Crowder, Director
WV Department of Environmental Protection (WVDEP)
Division of Air Quality (DAQ)
601 57th Street SE
Charleston, WV 25304

Re: Columbia Gas Transmission, LLC (Columbia)
Sherwood Compressor Station (WVDAQ Facility ID: 017-00162)
Title V Operating Permit Renewal Application

Ms. Crowder,

Columbia operates a Natural Gas Compressor Station in Sherwood, West Virginia. The facility currently maintains an NSR Permit No. R13-3313D under 45CSR13 and a Title V Permit No. R30-01700162-2020 under 45CSR30. The current Title V Permit to Operate expires on May 11, 2025.

This package contains the general application forms along with the required attachments for a Title V renewal permit application. Sherwood Compressor Station's Potential to Emit (PTE) exceeds 100 tons per year for Carbon Monoxide (CO) and Nitrogen Oxide (NO_X). For this reason, Sherwood is considered a Title V source for permitting purposes.

Should you have any questions or require additional information, please contact me by phone at (304) 357-2443 email at david_keatley@tcenergy.com.

Sincerely,

David Keatley
Environmental Analyst
USNG Environmental Compliance
TC Energy

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

1. **Name of Applicant (As registered with the WV Secretary of State's Office):** Columbia Gas Transmission, LLC	**2. Facility Name or Location:** Sherwood Compressor Station
3. DAQ Plant ID No.: 017-00162	**4. Federal Employer ID No. (FEIN):** 31-0802435-30

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence?
☒ Permit Renewal — What is the expiration date of the existing permit? 05/11/2025
☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

☐ Corporation ☐ Governmental Agency ☒ LLC
☐ Partnership ☐ Limited Partnership

7. Is the Applicant the:

☐ Owner ☐ Operator ☒ Both

If the Applicant is not both the owner and operator, please provide the name and address of the other party.

8. Number of onsite employees:

<10

9. Governmental Code:

☒ Privately owned and operated; 0
☐ Federally owned and operated; 1
☐ State government owned and operated; 2
☐ County government owned and operated; 3
☐ Municipality government owned and operated; 4
☐ District government owned and operated; 5

10. Business Confidentiality Claims

Does this application include confidential information (per 45CSR31)? ☐ Yes ☒ No

If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY"* guidance.

11. Mailing Address		
Street or P.O. Box: 1700 MacCorkle Ave, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Fax Number:**	

12. Facility Location (Physical Address)		
Street: 2678 Route 18 South	**City:** West Union	**County:** Doddridge
UTM Easting: 523.0 km	**UTM Northing:** 4,346.7 km	**Zone:** ☒ 17 or ☐ 18
Directions: From the town of Smithburg, head southwest on Smithbury St. towards Smithton Rd. and make a left. In approximately 0.5 miles, keep left to continue on Co. Rte. 50/22. In approximately 0.2 miles, turn left onto US-50 W, then left onto Snowbird Lane. At the end of Snowbird Lane, turn right onto Rt. 18. The Station will be on the right in approximately 0.5 miles.		
Portable Source? ☐ Yes ☒ No		
Is facility located within a nonattainment area? ☐ Yes ☒ No		**If yes, for what air pollutants?**
Is facility located within 50 miles of another state? ☐ Yes ☒ No		**If yes, name the affected state(s).** Ohio
Is facility located within 100 km of a Class I Area[1]? ☐ Yes ☒ No **If no, do emissions impact a Class I Area[1]?** ☐ Yes ☒ No		**If yes, name the area(s).** Otter Creek Wilderness Area

[1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.*

13. Contact Information		
Responsible Official: Caleb Raikes		**Title:** Manager of Operations
Street or P.O. Box: 2678 Route 18 South		
City: West Union	**State:** WV	**Zip:** 26456
Telephone Number: (304) 543-3077	**Cell Number:**	
E-mail address: caleb_raikes@tcenergy.com		
Environmental Contact: David J. Keatley PE, PhD		**Title:** Environmental Analyst USNG Environmental Compliance
Street or P.O. Box: 1700 MacCorkle Ave, SE, 5th Floor		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Cell Number:**	
E-mail address: david_keatley@tcenergy.com		
Application Preparer: Michael Dearing		**Title:** Project Manager
Company: Environmental Resources Management, Inc.		
Street or P.O. Box:		
City:	**State:**	**Zip:**
Telephone Number:	**Cell Number:**	
E-mail address: michael.dearing@erm.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Transmission		486210	4922

Provide a general description of operations.

Sherwood Compressor Station is a natural gas transmission and compressor facility covered by Standard Industrial Classification (SIC) Code 4922. The station has the potential to operate twenty-four (24) hours per day, seven (7) days per week, fifty-two (52) weeks per year.

The station consists of two (2) 15,427-hp Solar Mars 100 turbine compressor engines, two (2) 7,417-hp Solar Taurus 60 turbine compressor engines, one (1) 1,175-hp Waukesha VGF-P48GL emergency generator RICE, one (1) 0.80-MMBtu/hr fuel gas heater, one (1) 1.5-MMBtu/hr fuel gas heater, catalytic heaters with a total heat output of 2.88-MMBtu/hr, one (1) 1,000-gal wastewater storage tank, and one (1) 2,056-gal pipeline liquids storage tank.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR34)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS	☒ Section 112(d) MACT standards
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64)
☐ Cross-State Air Pollution Rule (45CSR43)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR 60 Subpart Dc – The proposed heaters are less than the 10 MMBtu/hr applicability threshold in §40 CFR 60.40c(a).

40 CFR 60 Subpart OOOO – The proposed units are not affected facilities listed under 40 CFR §60.5365.

☐ Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

- R13-3313D Condition 3.1.4: Do not discharge air pollutants which cause or contribute to an objectionable odor. [45CSR§4-3.1]
- R13-3313D Condition 3.3: Conduct stack tests as required and submit a report of the results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4: Facility-wide recordkeeping requirements.
- R13-3313D Condition 3.5: Facility-wide reporting requirements.

☐ Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

- R13-3313D Condition 3.3.1: Submit a protocol 30 days prior to testing and submit a report of all stack test results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4.1: Maintain records of all information required by the permit for at least five years.
- R13-3313D Condition 3.4.2: Maintain records of all odor complaints received, any investigation performed in response to such a complaint, and any responsive actions take [45CSR4]
- R13-3313D Condition 3.5.4: Submit a certified emissions statement and pay fees on an annual basis. [45CSR30]

Are you in compliance with all facility-wide applicable requirements? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

21. Active Permits/Consent Orders		
Permit or Consent Order Number	Date of Issuance MM/DD/YYYY	List any Permit Determinations that Affect the Permit *(if any)*
R13-3313	11/14/2016	
R13-3313A	12/18/2017	
R30-01700162-2020 (MM01)	05/11/2020	
R13-3313B	06/09/2022	
R13-3313C	06/19/2023	
R13-3313D	07/02/2024	
R30-01700162-2020 (MM02 and MM03)	09/03/2024	

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	240.13
Nitrogen Oxides (NO_X)	102.13
Lead (Pb)	-
Particulate Matter ($PM_{2.5}$)[1]	11.78
Particulate Matter (PM_{10})[1]	11.78
Total Particulate Matter (TSP)	11.78
Sulfur Dioxide (SO_2)	1.28
Volatile Organic Compounds (VOC)	23.94
Hazardous Air Pollutants[2]	Potential Emissions
Total HAPs	2.05
Formaldehyde	1.40
Regulated Pollutants other than Criteria and HAP	Potential Emissions
CO_2e	231,610.05

[1] $PM_{2.5}$ and PM_{10} are components of TSP.

[2] For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)		
☒	1.	Air compressors and pneumatically operated equipment, including hand tools.
☒	2.	Air contaminant detectors or recorders, combustion controllers or shutoffs.
☒	3.	Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
☒	4.	Bathroom/toilet vent emissions.
☒	5.	Batteries and battery charging stations, except at battery manufacturing plants.
☐	6.	Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
☐	7.	Blacksmith forges.
☐	8.	Boiler water treatment operations, not including cooling towers.
☐	9.	Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
☐	10.	CO_2 lasers, used only on metals and other materials which do not emit HAP in the process.
☒	11.	Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
☒	12.	Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
☒	13.	Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
☐	14.	Demineralized water tanks and demineralizer vents.
☐	15.	Drop hammers or hydraulic presses for forging or metalworking.
☐	16.	Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
☐	17.	Emergency (backup) electrical generators at residential locations.
☐	18.	Emergency road flares.
☐	19.	Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO_2, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis:

24. Insignificant Activities (Check all that apply)

☐ 20. Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27.

Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis:

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	lb/year
Pipeline Liquids Tank A01	0.07	0.29	<0.01	<0.01
Wastewater Tank A03	<0.01	<0.01	<0.01	<0.01
Totals	0.07	0.29	<0.01	<0.01

☐ 21. Environmental chambers not using hazardous air pollutant (HAP) gases.

☐ 22. Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.

☐ 23. Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.

☒ 24. Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.

☐ 25. Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.

☐ 26. Fire suppression systems.

☐ 27. Firefighting equipment and the equipment used to train firefighters.

☐ 28. Flares used solely to indicate danger to the public.

☐ 29. Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.

☐ 30. Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.

☐ 31. Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.

☐ 32. Humidity chambers.

☐ 33. Hydraulic and hydrostatic testing equipment.

☐ 34. Indoor or outdoor kerosene heaters.

☐ 35. Internal combustion engines used for landscaping purposes.

☐ 36. Laser trimmers using dust collection to prevent fugitive emissions.

☐ 37. Laundry activities, except for dry-cleaning and steam boilers.

☒ 38. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.

☐ 39. Oxygen scavenging (de-aeration) of water.

☐ 40. Ozone generators.

24. Insignificant Activities (Check all that apply)		
☐	41.	Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
☐	42.	Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
☐	43.	Process water filtration systems and demineralizers.
☐	44.	Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
☐	45.	Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
☐	46.	Routing calibration and maintenance of laboratory equipment or other analytical instruments.
☐	47.	Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
☐	48.	Shock chambers.
☐	49.	Solar simulators.
☐	50.	Space heaters operating by direct heat transfer.
☐	51.	Steam cleaning operations.
☐	52.	Steam leaks.
☐	53.	Steam sterilizers.
☐	54.	Steam vents and safety relief valves.
☐	55.	Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
☐	56.	Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
☒	57.	Such other sources or activities as the Director may determine.
☒	58.	Tobacco smoking rooms and areas.
☒	59.	Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**.
26. Emission Units
For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**.
For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**.
27. Control Devices
For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**.
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**.

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

Note: This Certification must be signed by a responsible official as defined in 45CSR§30-2.38.

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

Responsible official (type or print)	
Name: Caleb Raikes	Title: Manager of Operations

Responsible official's signature:

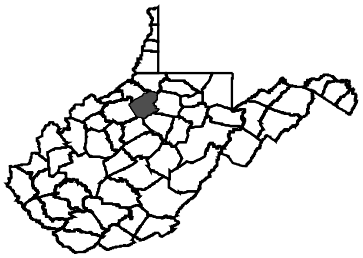
Signature: _____ Signature Date: _____

(Must be signed and dated in blue ink or have a valid electronic signature)

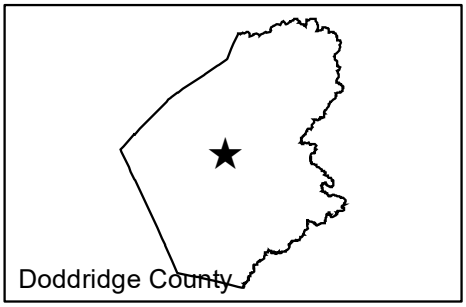
Note: Please check all applicable attachments included with this permit application:	
☒	ATTACHMENT A: Area Map
☒	ATTACHMENT B: Plot Plan(s)
☒	ATTACHMENT C: Process Flow Diagram(s)
☒	ATTACHMENT D: Equipment Table
☒	ATTACHMENT E: Emission Unit Form(s)
☐	ATTACHMENT F: Schedule of Compliance Form(s)
☐	ATTACHMENT G: Air Pollution Control Device Form(s)
☐	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s)

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

Attachment A
Area Map



West Virginia



0 1,000 2,000 4,000 Feet

N

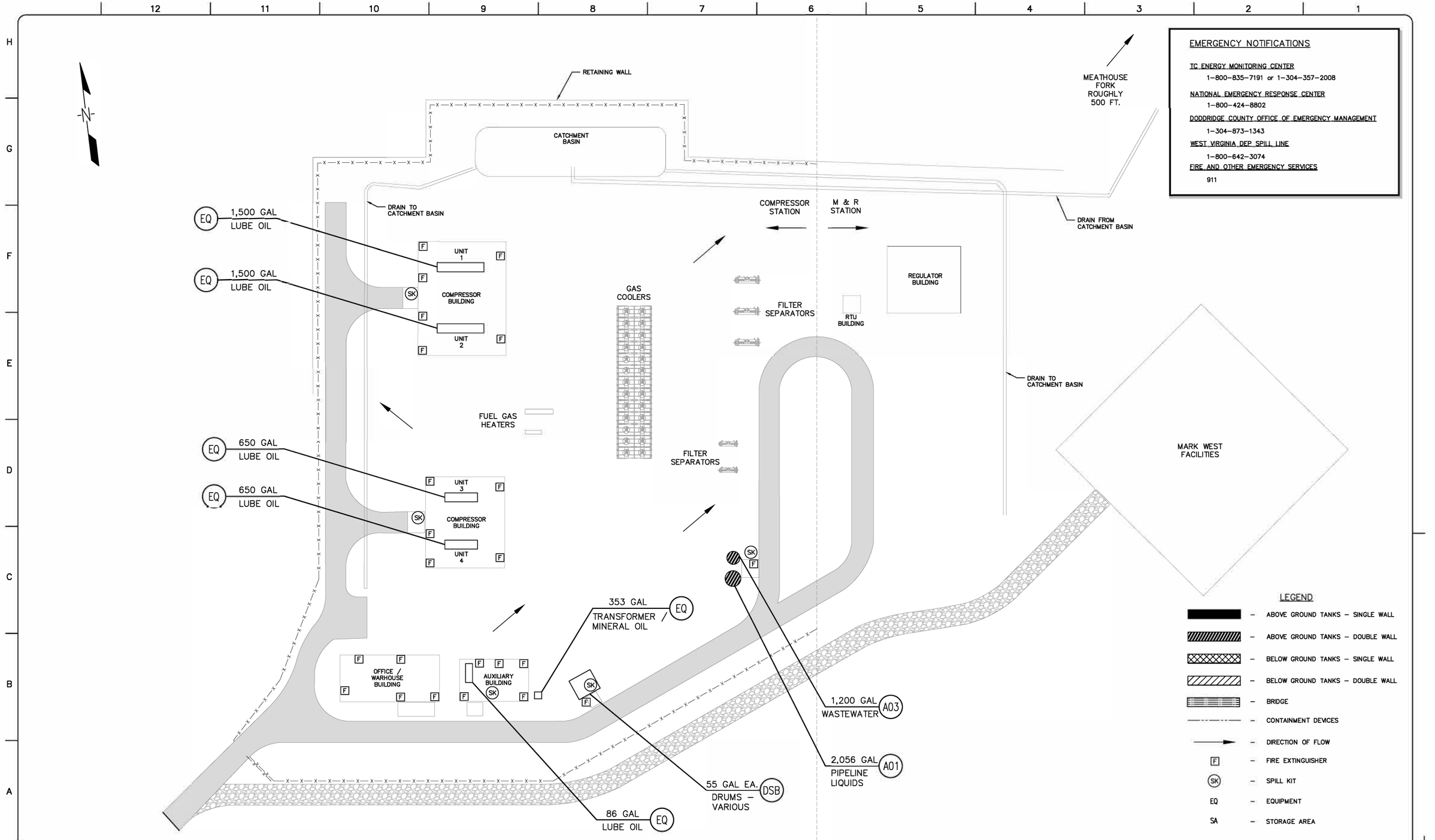
LAT. 39.269673 LON. -80.732527
DODDRIDGE COUNTY
WEST VIRGINIA

USGS 1:24K 7.5' Quadrangle:
Smithburg, WV

ERM	Sherwood Compressor Station 2678 WV Route 18 South Sherwood, West Virginia 26436	GIS Review: GM CHK'D: GM 0716980
Drawn By: SRV-05/05/2022	**Environmental Resources Management**	ATTACHMENT A

\\stddcfs02\data\Philadelphia\Team\DMMV\GIS\Projects\SiteLocationMaps\TC Energy_MXD\AttachmentB-SiteLocusMap_SherwoodCompressorStation_20220505.mxd - 5/5/2022|SRV

Attachment B
Plot Plan



EMERGENCY NOTIFICATIONS

TC ENERGY MONITORING CENTER
1–800–835–7191 or 1–304–357–2008

NATIONAL EMERGENCY RESPONSE CENTER
1–800–424–8802

DODDRIDGE COUNTY OFFICE OF EMERGENCY MANAGEMENT
1–304–873–1343

WEST VIRGINIA DEP SPILL LINE
1–800–642–3074

FIRE AND OTHER EMERGENCY SERVICES
911

LEGEND

- ABOVE GROUND TANKS – SINGLE WALL
- ABOVE GROUND TANKS – DOUBLE WALL
- BELOW GROUND TANKS – SINGLE WALL
- BELOW GROUND TANKS – DOUBLE WALL
- BRIDGE
- CONTAINMENT DEVICES
- DIRECTION OF FLOW
- F – FIRE EXTINGUISHER
- SK – SPILL KIT
- EQ – EQUIPMENT
- SA – STORAGE AREA

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
1	11/08/2023	CHANGED TITLE AND REPLACED A02 TANK DESIGNATION WITH A03. VOLUME CHANGED FROM 1500 TO 1200 GALLONS

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	LAG					

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

SHERWOOD COMPRESSOR STATION

FIA # | CHAINAGE: | DISCIPLINE #

PLOT PLAN – SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC)

SCALE | DRAWING No FD–C202–SPCC | REV 1

TIME: DESIGNFILE:

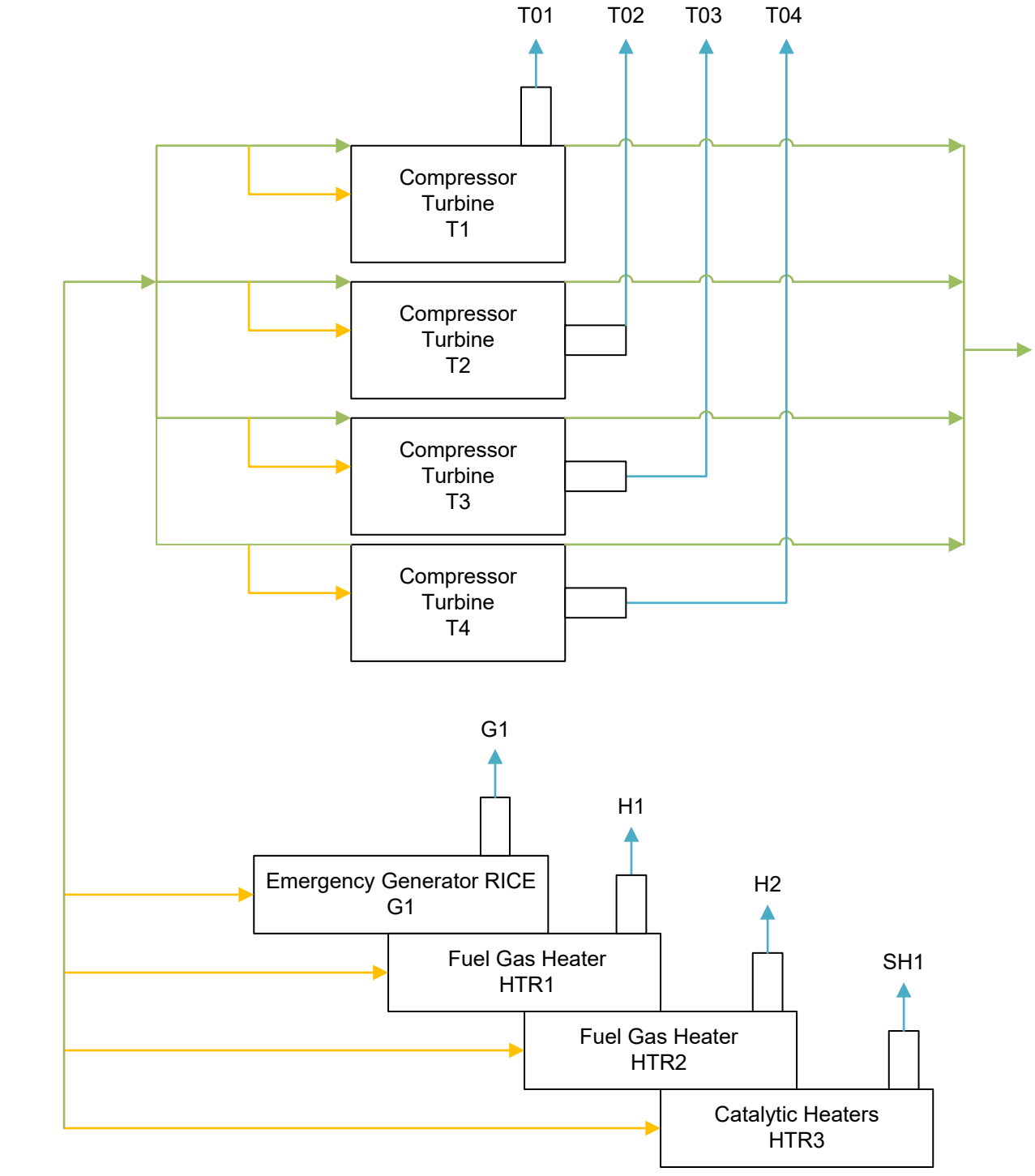
TC_JJD_BR_24x36.DWG 24X36

CADD DRAWING; DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ARCH D (24x36)

Attachment C
Process Flow Diagram

ATTACHMENT C
SHERWOOD COMPRESSOR STATION
PROCESS FLOW DIAGRAM



TC Energy

Attachment D
Equipment Table

Attachment D - Title V Equipment Table

(includes all emission units at the facility except those designated insignificant activities in Section 4, Item 24 of the General Forms

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
T1	T01	Compressor Turbine; Solar Taurus 60	2019	7,417 hp @ 32 °F	Existing	None
T2	T02	Compressor Turbine; Solar Taurus 60	2019	7,417 hp @ 32 °F	Existing	None
T3	T03	Compressor Turbine; Solar Mars 100	2024	15,427 hp @ 32 °F	Existing	None
T4	T04	Compressor Turbine; Solar Mars 100	2024	15,427 hp @ 32 °F	Existing	None
G1	G01	Waukesha VGF-P48GL Emergency Generator RICE	2019	1,175 hp	Existing	None
HTR1	H1	Fuel Gas Heater	2019	1.5 MMBtu/hr	Existing	None
HTR2	H2	Fuel Gas Heater	2019	0.8 MMBtu/hr	Existing	None
HTR3	SH1	Catalytic Heaters	2019	2.88 MMBtu/hr (total)	Existing	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment E
Emission Unit Forms

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T1, T2	Taurus 60 Turbine #1 Taurus 60 Turbine #2	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Taurus 60, Compressor Turbine #1

Natural gas-fired Solar Taurus 60, Compressor Turbine #2

Manufacturer: Solar	**Model number:** Taurus 60	**Serial number:**
Construction date: 02/25/2019 (in service)	**Installation date:** 02/25/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

7,417 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
66,904.7 scf/hr (based on 32°F)	586.09 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 68.24 MMBtu/hr (HHV, 32°F) 7,417 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 66,904.7 scf/hr; 586.09 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.74	38.94
Nitrogen Oxides (NO_X)	3.68	16.79
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.45	1.97
Particulate Matter (PM_{10})	0.45	1.97
Total Particulate Matter (TSP)	0.45	1.97
Sulfur Dioxide (SO_2)	3.90	0.21
Volatile Organic Compounds (VOC)	0.43	2.12
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.07	0.31
Formaldehyde	0.05	0.21
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	7,991.05	35,000.79

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 and 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

(6) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T3, T4	Mars 100 Turbine #3 Mars 100 Turbine #4	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Mars 100, Compressor Turbine #3

Natural gas-fired Solar Mars 100, Compressor Turbine #4

Manufacturer: Solar	**Model number:** Mars 100	**Serial number:**
Construction date: T3: 7/17/2024, T4: 10/9/2024 **(in service)**	**Installation date:** T3: 7/17/2024, T4: 10/9/2024 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

15,427 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
129,435 scf/hr (based on 32°F)	1,133.85 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 130.02 MMBtu/hr (HHV, 32°F) 15,427 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 129,435 scf/hr; 1,133.85 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	7.23	78.89
Nitrogen Oxides (NO_X)	7.12	32.51
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.87	3.82
Particulate Matter (PM_{10})	0.87	3.82
Total Particulate Matter (TSP)	0.87	3.82
Sulfur Dioxide (SO_2)	7.54	0.41
Volatile Organic Compounds (VOC)	0.83	4.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.13	0.59
Formaldehyde	0.09	0.41
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	15,459.58	67,712.97

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313d Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 & 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

(6) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
G1	Emergency Generator RICE	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired 4SLB Waukesha VGF-P48GL Emergency Generator RICE

Manufacturer: Waukesha	**Model number:** VGF-P48GL	**Serial number:**
Construction date: 04/10/2019 (in service)	**Installation date:** 04/10/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,175 HP

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
11,387 scf/hr	5.69 MMscf/yr	500 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 11.61 MMBtu/hr 1,175 HP	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 11,387 scf/hr; 5.69 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	10.36	1.30
Nitrogen Oxides (NO_X)	5.18	1.30
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	<0.01
Particulate Matter (PM_{10})	0.12	0.03
Total Particulate Matter (TSP)	0.12	0.03
Sulfur Dioxide (SO_2)	0.65	<0.01
Volatile Organic Compounds (VOC)	3.20	0.80
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.84	0.21
Formaldehyde	0.61	0.15
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	1,360.07	340.02

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, and CO: Vendor Data (20% of UHC for VOC)

$PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 3.2-2 (10/24) – 4SLB

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.2-2 (10/24) – 4SLB

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) Comply with 40 CFR 62 Subpart ZZZZ.

(2) R13-3313D Condition 6.1.1: Operating hours limited to 500 hours/year.

(3) R13-3313D Condition 6.1.2: Maximum emissions shall not exceed the following limits (tpy): NO_X - 1.30, CO - 2.59, VOC - 0.80.

(4) R13-3313D Condition 6.2.1: NO_X emissions shall not exceed 2.0 g/hp-hr or 160 ppm_{vd} at 15% O_2. CO emissions shall not exceed 1.0 g/hp-hr or 86 ppm_{vd} at 15% O_2 (excluding CH_2O emissions). [40 CFR §60.4233(e), Table I]

(5) 40 CFR 60 Subpart JJJJ work practice standards.

(6) 40 CFR 60 Subpart JJJJ notification requirements.

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) 40 CFR 63 Subpart ZZZZ; §63.6590(c)(1): Comply with NESHAP Subpart ZZZZ by complying with NSPS Subpart JJJJ.

(2) R13-3313D Condition 6.6.1: Maintain records of hours of operation including how many hours are spent for emergency operation, and reason for non-emergency operation. [40 CFR §50.4245(6)]

(2) R13-3313D Condition 6.3.1: Install a non-resettable hour meter. [40 CFR §60.4237(a)]

(3) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(4) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(5) R13-3313D Condition 6.4.1: Keep a maintenance plan and records of conducted maintenance as well as all notifications submitted. [40 CFR §60.4245(a)]

(6) R13-3313D Condition 6.6.1: Submit an initial notification within 30 days after construction. [40 CFR §60.4245(c)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR1	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1.5 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
1470.6 scf/hr	12.88 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 1.5 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 1470.6 scf/hr; 12.88 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.12	0.54
Nitrogen Oxides (NO_X)	0.15	0.64
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.01	0.05
Particulate Matter (PM_{10})	0.01	0.05
Total Particulate Matter (TSP)	0.01	0.05
Sulfur Dioxide (SO_2)	0.09	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.04
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	175.65	769.33

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR2	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

0.8 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 0.8 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.07	0.29
Nitrogen Oxides (NO_X)	0.08	0.34
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	0.02
Particulate Matter (PM_{10})	<0.01	0.02
Total Particulate Matter (TSP)	<0.01	0.02
Sulfur Dioxide (SO_2)	0.05	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.02
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	93.68	410.31

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR3	Catalytic Heaters	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Flameless Catalytic Heaters

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/30/2019 (in service)	01/30/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2.88 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 2.88 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.24	1.04
Nitrogen Oxides (NO_X)	0.28	1.24
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.02	0.07
Particulate Matter (PM_{10})	<0.01	0.02
Total Particulate Matter (TSP)	0.02	0.07
Sulfur Dioxide (SO_2)	0.16	<0.01
Volatile Organic Compounds (VOC)	0.02	0.07
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.02
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	337.24	1477.11

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A01	Pipeline Liquids Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

2,056 gallon pipeline liquids storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2,056 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	52,122 gal (12 times throughput of first 30 days of production)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	0.07	0.29
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	38.48	168.54

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A03	Wastewater Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

1,000 gallon wastewater storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,000 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	12,000 gal (12 turnovers)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	<0.01	<0.01
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	<0.01	0.01

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

Appendix A
Supplemental Calculations

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Facility Total PTE

Source	Annual Emissions															
	VOC		Total HAP		NO_x		CO		PM / $PM_{2.5}$ / PM_{10}		SO_2		CH_4		CO_2e	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.43	2.12	0.07	0.31	3.68	16.79	3.74	38.94	0.45	1.97	3.90	0.21	0.15	0.66	7,991.05	35,000.79
T02 - Solar Taurus 60 Turbine	0.43	2.12	0.07	0.31	3.68	16.79	3.74	38.94	0.45	1.97	3.90	0.21	0.15	0.66	7,991.05	35,000.79
T03 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	32.51	7.23	78.89	0.87	3.82	7.54	0.41	0.29	1.27	15,459.58	67,712.97
T04 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	32.51	7.23	78.89	0.87	3.82	7.54	0.41	0.29	1.27	15,459.58	67,712.97
G01 - Waukesha Emergency Generator RICE	3.20	0.80	0.84	0.21	5.18	1.30	10.36	2.59	0.12	0.03	0.65	<0.01	0.03	<0.01	1,360.07	340.02
H1 - Fuel Gas Heater	<0.01	0.04	<0.01	0.01	0.15	0.64	0.12	0.54	0.01	0.05	0.09	<0.01	<0.01	0.01	175.65	769.33
H2 - Fuel Gas Heater	<0.01	0.02	<0.01	<0.01	0.08	0.34	0.07	0.29	<0.01	0.05	0.05	<0.01	<0.01	<0.01	93.68	410.31
SH1 - Catalytic Heaters	0.02	0.07	<0.01	0.02	0.28	1.24	0.24	1.04	0.02	0.07	0.16	<0.01	<0.01	0.03	337.24	1,477.11
Insignificant Sources	0.07	0.29	<0.01	<0.01									1.37	6.00	38.48	168.55
Equipment Leaks (fugitive emissions)	0.27	1.18	<0.01	<0.01									21.77	95.37	609.79	2,670.87
Compressor Venting	0.17	0.76	<0.01	<0.01									14.07	61.65	394.16	1,726.44
Blowdowns	2.14	9.39	<0.01	<0.01									173.57	760.23	4,860.91	21,290.79
Proposed PTE[1]	**8.13**	**23.94**	**1.26**	**2.05**	**27.30**	**102.13**	**32.72**	**240.13**	**2.79**	**11.78**	**23.82**	**1.28**	**189.93**	**831.79**	**54,161.45**	**231,610.05**

Notes:
1. The facility PTE excludes fugitive emissions since transmission storage compressor stations are not one of the named source categories that include fugitive emissions under 45CSR30.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Facility Total HAPs Emissions

Source	Annual HAPs Emissions																							
	Total HAPs		Methanol		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene		2,2,4-Trimethylpentane		Acetaldehyde		Acrolein		1,3-Butadiene	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.07	0.31			0.05	0.21			<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T02 - Solar Taurus 60 Turbine	0.07	0.31			0.05	0.21			<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T03 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.08	<0.01	0.02	<0.01	0.04			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
T04 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.08	<0.01	0.02	<0.01	0.04			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
G01 - Waukesha Emergency Generator RICE	0.84	0.21	0.03	<0.01	0.61	0.15	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	0.02	0.06	0.01	<0.01	<0.01
H1 - Fuel Gas Heater	<0.01	0.01			<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01												
H2 - Fuel Gas Heater	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
H3 - Catalytic Heaters	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
Insignificant Sources	<0.01	<0.01					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01						
Equipment Leaks (fugitive emissions)	<0.01	<0.01																						
Compressor Venting	<0.01	<0.01																						
Blowdowns	<0.01	<0.01																						
Proposed PTE[1]	**1.26**	**2.05**	**0.03**	**<0.01**	**0.90**	**1.40**	**0.02**	**0.02**	**<0.01**	**0.02**	**0.06**	**0.23**	**0.01**	**0.06**	**0.03**	**0.11**	**<0.01**	**<0.01**	**0.11**	**0.09**	**0.06**	**0.03**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Taurus 60 Turbine (T01 - T02)

Horsepower	7,417	HP at 32°F	
Brake Specific Fuel Consumption	8,289	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	61.48	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	68.24	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	586.09	MMscf/yr	
	66,905	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x (15 ppmvd)		0.060	LHV	3.68	16.79	Vendor Data
CO (25 ppmvd)		0.061	LHV	3.74	38.94	Vendor Data
PM_{10}	5.64E-05	0.0066	HHV	0.45	1.97	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$	5.64E-05	0.0066	HHV	0.45	1.97	AP-42 Table 3.1-2a (4/00)
VOC (5 ppmvd)		0.007	LHV	0.43	2.12	Vendor Data (20% of UHC)
SO_2 (Maximum Hourly)	4.73E-04	0.0571	HHV	3.90		20 grains S / 100 scf
SO_2 (Average Annual)	5.92E-06	0.000714	HHV		0.21	0.25 grains S / 100 scf
CO_2	0.97	116.98		7,982.85	34,964.87	40 CFR Subpart C
CH_4	1.83E-05	2.20E-03		0.15	0.66	40 CFR Subpart C
N_2O	1.83E-06	2.20E-04		0.02	0.07	40 CFR Subpart C
Benzene	9.95E-08	1.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.08E-06	1.30E-04	HHV	<0.01	0.04	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.65E-07	3.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.32E-07	4.00E-05	HHV	<0.01	0.01	AP-42 Table 3.1-3 (4/00)
Acrolein	5.30E-08	6.40E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.89E-06	7.10E-04	HHV	0.05	0.21	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.56E-09	4.30E-07	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	1.08E-08	1.30E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.82E-08	2.20E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.40E-07	2.90E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Xylenes	5.30E-07	6.40E-05	HHV	<0.01	0.02	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	7,991.05	35,000.79	40 CFR 98 Subpart C
Total HAPs			0.00102	0.07	0.31	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating)
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors
- AP-42, Chapter 3.1 Table 3.1-2a and 3.1-3 references are from the April 2000 revision
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Taurus 60 (T01 - T02) - Emissions from Venting

Number of Pneumatic Actuators:	15	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	55,489	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8,760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	90.00	80.44	0.17	3.41	0.02	14.91	0.09	417.69	0.18	<0.01
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.25	<0.01
							Total:	974.60	0.43	<0.01

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
7. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Taurus 60 (T01 - T02) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	3.68	3.74	0.43
Low Temp (<0 °F)[2]	lb/hr	10.75	15.58	0.89
Low-Load (<50%)[3]	lb/hr	8.50	344.95	3.94
Startup / Shutdown[4]	lb/event	1.10	97.30	1.12

Notes:
1. Based on data from Solar Taurus 60 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8,507	15.67	15.89	1.82
Low Temp (<0 °F)		120	0.65	0.94	0.05
Low-Load (<50%)		100	0.43	17.25	0.20
Startup/ Shutdown	100	33	0.06	4.87	0.06
Total		8,760	16.79	38.94	2.12

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T01, T02 / Solar Taurus 60	0.23	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Mars 100 Turbine (T03 - T04)

Horsepower	15,427	HP at 32°F	
Brake Specific Fuel Consumption	7,710	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	118.94	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	132.02	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	1,133.85	MMscf/yr	
	129,435	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x (15 ppmvd)		0.0600	LHV	7.12	32.51	Vendor Data
CO (25 ppmvd)		0.0610	LHV	7.23	78.89	Vendor Data
PM_{10}	5.64E-05	0.0066	HHV	0.87	3.82	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$	5.64E-05	0.0066	HHV	0.87	3.82	AP-42 Table 3.1-2a (4/00)
VOC (5 ppmvd)		0.007	LHV	0.83	4.16	Vendor Data
SO_2 (Maximum Hourly)	4.40E-04	0.0571	HHV	7.54		20 grains S / 100 scf
SO_2 (Average Annual)	5.50E-06	0.000714	HHV		0.41	0.25 grains S / 100 scf
CO_2	0.90	116.98		15,443.72	67,643.49	40 CFR Subpart C
CH_4	1.70E-05	2.20E-03		0.29	1.27	40 CFR Subpart C
N_2O	1.70E-06	2.20E-04		0.03	0.13	40 CFR Subpart C
Benzene	9.25E-08	1.20E-05	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.00E-06	1.30E-04	HHV	0.02	0.08	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.47E-07	3.20E-05	HHV	0.00	0.02	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.08E-07	4.00E-05	HHV	0.01	0.02	AP-42 Table 3.1-3 (4/00)
Acrolein	4.93E-08	6.40E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.47E-06	7.10E-04	HHV	0.09	0.41	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.32E-09	4.30E-07	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	1.00E-08	1.30E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.70E-08	2.20E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.24E-07	2.90E-05	HHV	0.00	0.02	AP-42 Table 3.1-3 (4/00)
Xylenes	4.93E-07	6.40E-05	HHV	0.01	0.04	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	15,459.58	67,712.97	40 CFR 98 Subpart C
Total HAPs			0.00102	0.13	0.59	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating)
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors
- AP-42, Chapter 3.1 Table 3.1-2a and 3.1-3 references are from the April 2000 revision
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8,760 hr/yr
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Mars 100 (T03 - T04) - Emissions from Venting

Number of Pneumatic Actuators:	7	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	95,620	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8,760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	42.00	37.54	0.08	1.59	0.01	6.96	0.04	194.92	0.09	<0.01
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.25	<0.01
							Total:	751.84	0.33	<0.01

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
7. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Solar Mars 100 (T03 - T04) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	7.12	7.23	0.83
Low Temp (<0 °F)[2]	lb/hr	21.12	30.60	1.75
Low-Load (<50%)[3]	lb/hr	16.10	653.41	7.47
Startup/ Shutdown[4]	lb/event	3.10	272.70	3.12

Notes:
1. Based on data from Solar Mars 100 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8,507	30.28	30.75	3.53
Low Temp (<0 °F)		120	1.27	1.84	0.11
Low-Load (<50%)		100	0.81	32.67	0.37
Startup/ Shutdown	100	33	0.16	13.64	0.16
Total		8,760	32.51	78.89	4.16

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T03, T04 / Solar Mars 100	0.21	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Waukesha VGF-P48GL Emergency Generator RICE (G1)

Horsepower	1,175	HP
Brake Specific Fuel Consumption	9,885	Btu/Bhp-hr
Total Heat Input	11.61	MMBtu/hr
Operating Hours	500	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	5.69	MMscf/yr
	11,387.13	scf/hr
Quantity	1	

Pollutant	Emission Factor	Emission Factor Units	Emission Rate		Emission Factor Reference
			lb/hr	ton/yr	
NO_x	2.00	g/bhp-hr	5.18	1.30	Vendor Data
CO	4.00	g/bhp-hr	10.36	2.59	Vendor Data
VOC	1.00	g/bhp-hr	3.20	0.80	Vendor Data
PM Filterable	7.71E-05	lb/MMBtu	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
PM Condensable	9.91E-03	lb/MMBtu	0.12	0.03	AP-42 Table 3.2-2 (10/24) - 4SLB
SO_2 (Maximum Hourly)	20	grains S / 100 ft^3	0.65		AP-42 Chapter 5.3
SO_2 (Average Annual)	0.25	grains S / 100 ft^3		<0.01	AP-42 Chapter 5.3
CO_2	116.977	lb/MMBtu	1,358.67	339.67	40 CFR Subpart C
CH_4	0.002205	lb/MMBtu	0.03	<0.01	40 CFR Subpart C
N_2O	0.000220	lb/MMBtu	0.00	<0.01	40 CFR Subpart C
1,3-Butadiene	2.67E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Methanol	2.50E-03	lb/MMBtu	0.03	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Hexane	1.11E-03	lb/MMBtu	0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Benzene	4.40E-04	lb/MMBtu	0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Toluene	4.08E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Ethylbenzene	3.97E-05	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Acetaldehyde	8.36E-03	lb/MMBtu	0.10	0.02	AP-42 Table 3.2-2 (10/24) - 4SLB
Acrolein	5.14E-03	lb/MMBtu	0.06	0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Xylene	1.84E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Formaldehyde	5.28E-02	lb/MMBtu	0.61	0.15	AP-42 Table 3.2-2 (10/24) - 4SLB
CO_2e		117.1	1,360.07	340.02	40 CFR 98 Subpart C
Total HAPs		0.07219	0.84	0.21	AP-42 Table 3.2-2 (10/24) - 4SLB

Notes:
- Vendor-provided VOC emission factor does not include Formaldehyde. Formaldehyde was added to lb/hr and tpy to provide accurate PTE.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2-2 references are from the October 2024 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 500 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Example Calculations:
Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x BSFC **(Btu/hp-hr)** ÷ 1,000,000 x Engine Rating **(bhp)**
Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(hp)** x (1 **lb**/453.6 **g**)
Maximum Hourly Emissions SO_2 Caclulation **(lb/hr)** = (0.25 grain S / 100ft^3) * Fuel throughput **(ft^3 / hr)** * (1lb / 7000 grains) * (lbmol S / 32.06 lb S) * (lbmol SO_2 / lbmol S) *(64.07 lb SO_2 / lbmol SO_2)

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Fuel Gas Heater (H1)

Heat Input	1.50	MMBtu/hr
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	12.88	MMscf/yr
	1,470.59	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.15	0.64	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.12	0.54	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.04	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.09		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	175.47	768.54	40 CFR Subpart C
CH_4		0.002205	<0.01	0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	175.65	769.33	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Fuel Gas Heater (H2)

Heat Input	0.80	MMBtu/hr
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	6.87	MMscf/yr
	784.3	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.08	0.34	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.07	0.29	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	<0.01	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.05		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	93.58	409.89	40 CFR Subpart C
CH_4		0.002205	<0.01	<0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	93.68	410.31	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	<0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025).
  GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Catalytic Heaters (SH1)

Heat Input	2.880	MMBtu/hr (total)
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	24.73	MMscf/yr
	2,823.53	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.28	1.24	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.24	1.04	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	0.02	0.07	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.02	0.07	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.16		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	336.89	1475.60	40 CFR Subpart C
CH_4		0.002205	<0.01	0.03	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.02	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	337.24	1477.11	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.02	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025).

GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Fugitive Emissions from Leaks

Number of Compressors: 4

Component	Facility Components	Estimated Leaking Components[2]	Emission Factor[3]	Fugitive Emissions							
				Total	CH_4[4]	CO_2[4]	CH_4[5]	CO_2[5]	CO_2e[6]	VOC[7]	HAPs[8]
			scf/hr / component	scf/yr	scf/yr	scf/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service											
Valve	515	11	9.6	925056.00	826833.28	1764.94	17.50	0.10	490.09	0.22	<0.01
Connector	1074	22	4.9	944328.00	844058.97	1801.71	17.86	0.10	500.30	0.22	<0.01
Open-Ended Line	0	0	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01
Pressure Relief Valve	10	1	7.8	68328.00	61072.91	130.36	1.29	<0.01	36.20	0.02	<0.01
Meter	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Other	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Non-Compressor Service											
Valve	559	12	9.6	1,009,152.00	901,999.94	1,925.39	19.09	0.11	534.64	0.24	<0.01
Connector	1724	35	4.9	1,502,340.00	1,342,821.09	2,866.36	28.42	0.17	795.92	0.35	<0.01
Open-Ended Line	0	0	6.9	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Pressure Relief Valve	13	1	7.8	273,312.00	244,291.65	521.46	5.17	0.03	144.80	0.06	<0.01
Meter	8	1	9.1	318,864.00	285,006.92	608.37	6.03	0.04	168.93	0.07	<0.01
Other	18	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
						Total:	95.37	0.56	2,670.87	1.18	<0.01

Notes:

1. Estimated component leaks per compressor based on average measurements throughout the Columbia pipeline system.
2. Estimated number of leaking components utilizing a 2% component leak rate factor throughout the Columbia pipeline system obtained from fugitive leak survey results at Columbia facilities, and rounded up to the nearest integer.
3. Emission factors from 40 CFR 98 Subpart W Table W-2 (Updated April 2024 and effective January 2025).
4. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in Sherwood natural gas data.
5. Conversion based on densities of GHG as provided in 40 CFR 98.233(v).
6. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
7. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
8. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Blowdown Emissions

Component	Emission Rate (ton/yr)				
	CH_4 [1]	CO_2	CO_2e	VOC [2]	HAPs [3]
Equipment Blowdowns	655.74	3.83	18,364.63	8.10	<0.01
Pigging Blowdowns	17.65	0.10	494.42	0.22	<0.01
Station Emergency Shutdown	86.83	0.51	2,431.74	1.07	<0.01
Blowdown, Total	760.23	4.45	21,290.79	9.39	<0.01

Notes:
1. CH_4 emission rates based on 89.38 vol% CH_4 in annualized Sherwood natural gas data
2. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
3. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Sherwood Facility Wide Emergency Shutdown (ESD) PTE Emission Calculations
Blowdown Emissions per Event (mscf/event): 2,295.0
Blowdown Events per Year: 2

Parameter	Gas Loss from ESD (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
ESD Emissions	4,590.0	4,102.63	8.76	86.83	0.51	2,431.74	1.07	0.001

Notes:
- Gas loss volume based on TC Energy Engineering Department calculations using estimated facility piping volume, the average suction pressure, and discharge at MAOP. This volume would also be used when reporting ESD gas loss events at Sherwood to PHMSA.

Compressor Startup/Shutdown PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
Unit 1-2	100	216.0	21,600	19,307	41.21	408.61	2.39	11,443.46	5.05	<0.01
Unit 3-4	100	104.0	10,400	9,296	19.84	196.74	1.15	5,509.81	2.43	<0.01
Filter Separators A-C	9	264.0	2,376	2,124	4.53	44.95	0.26	1,258.78	0.56	<0.01
Filter Separators D-E	6	48.0	288	257	0.55	5.45	0.03	152.58	0.07	<0.01
Total	--	--	34,664	30,983	66.14	655.74	3.83	18,364.63	8.10	<0.01

Pigging PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
LR9003 (30" x 24" Barrel) L&R	12	12.21	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LR9002 (42" x 36" Barrel) L&R	12	35.11	421	377	0.80	7.97	0.05	223.21	0.10	<0.01
LR9002 (42" x 36" Barrel) L&R	12	42.66	512	458	0.98	9.68	0.06	271.21	0.12	<0.01
Total	--	--	933	834	1.78	17.65	0.10	494.42	0.22	<0.01

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Natural Gas Composition

Representative Composition of Natural Gas

Natural Gas Composition	Molar Fraction[1] (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
Nitrogen	0.48	28.01	0.1339	0.7605
Carbon Dioxide	0.19	44.01	0.0840	0.4769
Methane	89.38	16.04	14.3395	81.4432
Ethane	9.55	30.07	2.8723	16.3135
Propane	0.39	44.10	0.1731	0.9831
iso-Butane	0.0026	58.12	0.0015	0.0086
n-Butane	0.0022	58.12	0.0013	0.0073
iso-Pentane	0.0006	72.15	0.0004	0.0025
n-Pentane	0.0005	72.15	0.0004	0.0022
C_{6+} Components	0.0004	89.09	0.0004	0.0023
Total	100.00	-	17.61	100.00

C_{6+} HAP Composition[2]	Molar Fraction (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
2,2,4-Trimethylpentane	4.98E-06	114.23	5.69E-06	3.23E-05
Benzene	5.43E-06	78.11	4.24E-06	2.41E-05
Ethylbenzene	2.24E-07	106.17	2.38E-07	1.35E-06
n-Hexane	8.45E-05	86.18	7.29E-05	4.14E-04
Toluene	3.64E-06	92.14	3.35E-06	1.90E-05
Xylenes	1.80E-06	106.17	1.91E-06	1.08E-05
Total HAPs	1.01E-04	-	8.83E-05	5.01E-04

Totals	Mol %	Weight %
Total VOCs	0.40	1.01
Total HAPs	1.01E-04	5.01E-04

Ratios	Mol	Weight
VOC / Methane Ratio	4.46E-03	1.24E-02
HAPs / Methane Ratio	1.13E-06	6.16E-06

Mass Fraction Conversion Data

Compound	Mol Weight (g/mol)	Mass in Gas Sample (g)	Weight %	Mass %
CO_2	44.01	8.40	0.0048	0.4770
N_2	28.02	13.39	0.0076	0.7607
Methane	16.04	1433.69	0.8144	81.4400
Ethane	30.07	287.23	0.1632	16.3159
Propane	44.09	17.31	0.0098	0.9831
I-Butane	58.12	0.15	0.0001	0.0086
N-Butane	58.12	0.13	0.0001	0.0073
I-Pentane	72.15	0.04	0.0000	0.0025
N-Pentane	72.15	0.04	0.0000	0.0022
Other hexanes	86.18	0.04	0.0000	0.0022
n-hexane	86.18	0.01	0.0000	0.0004
2,2,4 - Trimethylpentane	114.23	0.00	0.0000	0.0000
Benzene	78.11	0.00	0.0000	0.0000
Toluene	92.14	0.00	0.0000	0.0000
Ethylbenzene	106.17	0.000	0.0000	0.0000
Xylenes	106.17	0.00	0.0000	0.0000

Notes:

1. Natural gas analysis obtained from gas chromatograph readings from site data sheet.
2. C_{6+} HAP composition molar fractions were derived from the GRI-GLYCALC v4.0 C_{6+} analysis multipliers for the Natural Gas Transmission Industry Segment.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Insignificant Sources Emissions

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	ton/year
A01 - Pipeline Liquids Tank	0.07	0.29	<0.01	<0.01
A03 - Wastewater Tank	<0.01	<0.01	<0.01	<0.01
Totals	**0.07**	**0.29**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Pipeline Liquids Tank A01 - Insignificant Source

Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
CH_4	1.37	6.00
CO_2	0.15	0.65
Propane	0.05	0.21
Isobutane	0.01	0.06
n-Butane	<0.01	0.02
Isopentane	<0.01	<0.01
n-Pentane	<0.01	<0.01
Hexane	<0.01	<0.01
Heptane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
C_{6+}	<0.01	<0.01
VOCs	0.07	0.29
Total HAPs	<0.01	<0.01
CO_2e	38.48	168.54

Notes:
- Tank emission rates were calculated using Promax software. Promax output emissions are attached.
- Emission profiles shown above are for one (1) 2,056 gallon Condensate Tanks with 12 Turnovers per year.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source

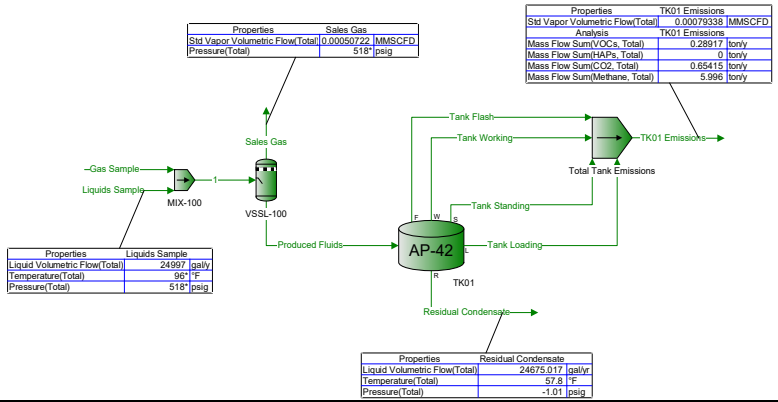
Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
CH_4	<0.01	<0.01
CO_2	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
n-Hexane	<0.01	<0.01
2,2,4-Trimethylpentane	<0.01	<0.01
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01
CO_2e	0.00	0.01

Notes:
- Tank emission rates were calculated using Promax software.
- Emission profiles shown above are for one (1) 1,000 gallon Condensate Tank with 12 Turnovers per year.

2056 gal
Plant Schematic

Client Name:	TC Energy	Job: Condensate Tank Emissions
Location:	Sherwood Station	
Flowsheet:	2056 gal	

TC Energy
Sherwood Station
TK01 Condensate Tank Emissions



* User Specified Values
? Extrapolated or Approximate Values

Columbia Gas Transmission, LLC Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Assumptions

	Wastewater Tank
Capacity (gal)	1,000
Turnovers	12
Composition	100% Mineral Oil
Location	Charleston, WV
Height	3.49118433
Diameter	6.98236866

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source Emission
Master Calculations - Fixed Roof Tanks

Tank ID	Storage Tank Paramenters										
	Vessel Type	Diameter D (ft)	Straight Side (ft)	Roof Height (ft)	Effective Tank Height (ft)	Void Volume (gal)	Maximum Working Volume (gal)	Isothermal Yes/No	Conservation Vent Low (psig)	High (psig)	Paint Solar Absorptance dimensionless
Wastewater Tank A03	Horizontal Storage	6.9824	3.4912	N/A	N/A	1000	1000	Normal	-0.03	0.03	0.25

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Material Stored			Annual Standing Storage Losses (Uncontrolled)				
	Material Type	Material Name	Composition Reference	Vapor Space Vv (ft^3)	Vapor Density Wv (lb/ft^3)	Vapor Space Expansion Factor KE dimensionless	Vented Vapor Saturation Factor Ks dimensionless	VOC Standing Losses Ls (lb/yr)
Wastewater Tank A03	Compound	Mineral Oil (White)	composition link	66.8856	0.001633333	0.037708333	0.993166667	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Annual Working Losses (Uncontrolled)							
	Tla (°F)	Vapor Molecular Weight Mv (lb/lb-mole)	VP at Tla Pva (psia)	Throughput Q (gal/yr)	Q (bbl/yr)	Turnover Factor Kn dimensionless	Crude Oil Factor Kp dimensionless	Working Losses VOC Lw (lb/yr)
Wastewater Tank A03	57.10931667	194.27	0.04715833	12000	285.7143	1	1	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Loading Operation			Annual Emissions		Annual Emissions	
	Pump-In Rate (gph)	VOC Rate Uncontrolled (lb/hr)	VOC Rate Controlled (lb/hr)	Uncontrolled VOC (lb)	Controlled VOC (lb)	Uncontrolled VOC (tpy)	Controlled VOC (tpy)
Wastewater Tank A03				0.000	0	0.000	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - July 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Wastewater Tank

Activity Title	Wastewater emissions
Climate	West Virginia, Charleston
pa	14.2535 psia
Equipment Tag	Wastewater Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Normal Storage Tank (11/2019 Rev.)

Working and Breathing Loss Calculation	
Void Space Volume	1000 gal
Working Volume	1000 gal
Working Volume	133.6806 ft^3
Shell Diameter	6.9824 ft
Straight Side Height	3.4912 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0.03
pbv	-0.03
Equipment Comment	
Activity Comment	
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents	500.000 gal	20.000 °C	3429.959 lb		17.656 lb-M	

Mixture Name:	Mixture						
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
	Mineral Oil (White)	2.1714	3429.9594	1	17.6556	1	1	2.1714

Kp (product factor)	1

Month		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		
Q	(gal)	1016.3934	950.8197	1016.393	983.6066	1016.393	983.6066	1016.3934	1016.393	983.6066	1016.393	983.6066	1016.393	12000	(sum)
Vq	(ft^3)	135.872	127.1061	135.872	131.4891	135.872	131.4891	135.872	135.872	131.4891	135.872	131.4891	135.872	1604.167	(sum)
N (period)	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
N (scaled to annual)	(number)	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	143.6064	(sum)
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(avg)
Days	(number)	31	29	31	30	31	30	31	31	30	31	30	31	366	(sum)
Compound Molecular Weights (lb/lb-M)															
Mineral Oil (White)	(Mv)	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	(lb/lb-mole)
Compound Vapor Pressures (Pva)															
Mineral Oil (White)	(mmHg)	2.1714	2.1714	2.1714	2.1714	2.1714	2.9375	3.5041	3.2718	2.1714	2.1714	2.1714	2.1714	2.438	(avg)
Working Loss Calculations (Uncontrolled)															
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(average)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(average)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(average)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(average)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(average)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(average)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(average)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(average)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(average)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(average)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
n	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
Compound Vapor Density (vW(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Working Losses (Lw)															
Air	(lb)	10.5746	9.8171	10.2683	9.7543	9.9042	9.4283	9.6721	9.7009	9.5222	10.0677	9.9353	10.4738	119.1188	(sum)
Mineral Oil (White)	(lb)	0.2094	0.1943	0.2031	0.1929	0.1958	0.2523	0.3091	0.2894	0.1883	0.1992	0.1967	0.2074	2.6379	(sum)
Breathing Loss Calculations (Uncontrolled)															
tan	(°R)	482.67	485.37	494.67	502.47	511.17	519.47	524.07	523.07	516.17	503.87	495.97	487.67	503.8867	(avg)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(avg)
tax	(°R)	500.87	504.97	516.37	526.47	535.17	542.77	545.37	544.07	538.47	527.87	516.97	505.67	525.42	(avg)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(avg)
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(avg)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(avg)
i	(Btu/ft²day)	625.9737	850.2836	1184.686	1514.647	1780.202	1910.6	1836.9933	1675.503	1369.972	1046.039	678.9578	533.0136	1250.573	(avg)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(avg)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(avg)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
dPv	(psia)	0	0	0	0	0.0093	0.0352	0.038	0.0364	0.0176	0	0	0	0.011375	(avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	(avg)
dTv	(°R)	15.8699	17.9714	21.1134	24.3732	25.701	25.863	24.095	23.0775	22.4599	22.0302	18.0948	15.2651	21.3262	(avg)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(avg)
ks	(number)	0.9939	0.9939	0.9939	0.9939	0.9939	0.9918	0.9902	0.9909	0.9939	0.9939	0.9939	0.9939	0.993167	(avg)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(avg)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(avg)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(avg)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(avg)
plx	(psia)	0.042	0.042	0.042	0.042	0.0513	0.0772	0.0868	0.0815	0.0596	0.042	0.042	0.042	0.0542	(avg)
pln	(psia)	0.042	0.042	0.042	0.042	0.042	0.042	0.0488	0.0451	0.042	0.042	0.042	0.042	0.042825	(avg)
Compound Vapor Density (wV(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Breathing Losses (Ls)															
Air	(lb)	4.5151	4.7889	5.8571	6.3885	6.8431	6.7124	6.3834	6.1225	5.7289	5.8899	4.7644	4.2287	68.2229	(sum)
Mineral Oil (White)	(lb)	0.0889	0.0942	0.1152	0.1256	0.1344	0.1782	0.202	0.181	0.1126	0.1158	0.0938	0.0832	1.5249	(sum)
Total Losses (Lt)															
Air	(lb)	15.0897	14.6059	16.1254	16.1428	16.7472	16.1406	16.0555	15.8234	15.2511	15.9576	14.6997	14.7026	187.3415	(sum)
Mineral Oil (White)	(lb)	0.2982	0.2885	0.3183	0.3184	0.3302	0.4305	0.5111	0.4704	0.301	0.3151	0.2905	0.2906	4.1628	(sum)

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Permit Renewal - Sherwood Compressor Station

David Keatley <david_keatley@tcenergy.com> Mon, Jul 14, 2025 at 4:27 PM
To: "Barron, Sarah K" <sarah.k.barron@wv.gov>

Sarah,

Attached are the updated PTE calculations for G1. The compressors associated with turbines T3 and T4 where not replaced and the turbines were replaced with like kind turbines, so the centrifugal compressors associated with turbines T3 and T4 are not subject to NSPS OOOOb.

David Keatley

[Quoted text hidden]

Sherwood TV_Renewal App 07_2025.pdf
3764K

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Permit Renewal - Sherwood Compressor Station

Barron, Sarah K <sarah.k.barron@wv.gov> Wed, Jun 25, 2025 at 10:13 AM
To: David Keatley <david_keatley@tcenergy.com>

David,

I finally had some time to review the revised application for the Sherwood Compressor Station, and I noticed that the PTE for CO and VOCs from the emergency generator G1 are still based on the former manufacturer guaranteed emission factors (1.6 g/hp-hr for CO; 0.32 g/hp-hr for VOC) rather than the updated guaranteed emission factors (4.0 g/hp-hr for CO; 1.0 g/hp-hr for VOC) reported in the applications for R13-3313C and R30-01700162-2020 (MM02). Please update the generator's emission calculations and the facility-wide emission calculations to reflect the generator's updated PTE and permitted emission limits.

Additionally, please explain whether or not the centrifugal compressors associated with the replaced turbines T3 and T4 are subject to 40 C.F.R. Part 60 Subpart OOOOb.

Thanks,
- Sarah
[Quoted text hidden]

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Permit Renewal - Sherwood Compressor Station

David Keatley <david_keatley@tcenergy.com> Mon, Apr 14, 2025 at 8:33 AM
To: Sarah K Barron <sarah.k.barron@wv.gov>

Sarah,

Attached is the updated application.

David Keatley

[Quoted text hidden]
[Quoted text hidden]

Sherwood TV_Renewal App 04_2025 Signed.pdf
3850K

Division of Air Quality Permit Application Submittal

Please find attached a permit application for : Columbia Gas Transmission, LLC; Sherwood Compressor Station

[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 017-00162
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R30-01700162-2020 (MM02 and MM03), R13-3313D

- Type of NSR Application (check all that apply):
  - ☐ Construction
  - ☐ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Revision (if any)**:
  - ☐ Title V Initial
  - ☑ Title V Renewal
  - ☐ Administrative Update
  - ☐ Minor Modification
  - ☐ Significant Modification
  - ☐ Off Permit Change

****If any box above is checked, include the Title V revision information as ATTACHMENT S to this application.**

- Payment Type:
  - ☐ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
    - Name:
    - Email:
    - Phone Number:
  - ☑ Company Contact
    - Name: David Keatley
    - Email: david_keatley@tcenergy.com
    - Phone Number: (304) 357-2443
  - ☐ Consultant
    - Name:
    - Email:
    - Phone Number:

Columbia Gas Transmission, LLC

Air Permit Application for Title V Renewal
Sherwood Compressor Station

Sherwood, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Charleston, West Virginia

April 2025

Columbia Gas Transmission, LLC
1700 MacCorkle Avenue SE
Charleston, WV 25314

April 3rd, 2025

Laura M. Crowder, Director
WV Department of Environmental Protection (WVDEP)
Division of Air Quality (DAQ)
601 57th Street SE
Charleston, WV 25304

Re: Columbia Gas Transmission, LLC (Columbia)
Sherwood Compressor Station (WVDAQ Facility ID: 017-00162)
Title V Operating Permit Renewal Application

Ms. Crowder,

Columbia operates a Natural Gas Compressor Station in Sherwood, West Virginia. The facility currently maintains an NSR Permit No. R13-3313D under 45CSR13 and a Title V Permit No. R30-01700162-2020 under 45CSR30. The current Title V Permit to Operate expires on May 11, 2025.

This package contains the general application forms along with the required attachments for a Title V renewal permit application. Sherwood Compressor Station's Potential to Emit (PTE) exceeds 100 tons per year for Carbon Monoxide (CO) and Nitrogen Oxide (NO_X). For this reason, Sherwood is considered a Title V source for permitting purposes.

Should you have any questions or require additional information, please contact me by phone at (304) 357-2443 email at david_keatley@tcenergy.com.

Sincerely,

David Keatley
Environmental Analyst
USNG Environmental Compliance
TC Energy

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

1. **Name of Applicant (As registered with the WV Secretary of State's Office):** Columbia Gas Transmission, LLC	**2. Facility Name or Location:** Sherwood Compressor Station
3. DAQ Plant ID No.: 017-00162	**4. Federal Employer ID No. (FEIN):** 31-0802435-30

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence?
☒ Permit Renewal — What is the expiration date of the existing permit? 05/11/2025
☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

☐ Corporation ☐ Governmental Agency ☒ LLC
☐ Partnership ☐ Limited Partnership

7. Is the Applicant the:

☐ Owner ☐ Operator ☒ Both

If the Applicant is not both the owner and operator, please provide the name and address of the other party.

8. Number of onsite employees:

<10

9. Governmental Code:

☒ Privately owned and operated; 0
☐ Federally owned and operated; 1
☐ State government owned and operated; 2
☐ County government owned and operated; 3
☐ Municipality government owned and operated; 4
☐ District government owned and operated; 5

10. Business Confidentiality Claims

Does this application include confidential information (per 45CSR31)? ☐ Yes ☒ No

If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY"* guidance.

11. Mailing Address		
Street or P.O. Box: 1700 MacCorkle Ave, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Fax Number:**	

12. Facility Location (Physical Address)		
Street: 2678 Route 18 South	**City:** West Union	**County:** Doddridge
UTM Easting: 523.0 km	**UTM Northing:** 4,346.7 km	**Zone:** ☒ 17 or ☐ 18
Directions: From the town of Smithburg, head southwest on Smithbury St. towards Smithton Rd. and make a left. In approximately 0.5 miles, keep left to continue on Co. Rte. 50/22. In approximately 0.2 miles, turn left onto US-50 W, then left onto Snowbird Lane. At the end of Snowbird Lane, turn right onto Rt. 18. The Station will be on the right in approximately 0.5 miles.		
Portable Source? ☐ Yes ☒ No		
Is facility located within a nonattainment area? ☐ Yes ☒ No		**If yes, for what air pollutants?**
Is facility located within 50 miles of another state? ☐ Yes ☒ No		**If yes, name the affected state(s).** Ohio
Is facility located within 100 km of a Class I Area[1]? ☐ Yes ☒ No **If no, do emissions impact a Class I Area[1]?** ☐ Yes ☒ No		**If yes, name the area(s).** Otter Creek Wilderness Area

[1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.*

13. Contact Information		
Responsible Official: Caleb Raikes		**Title:** Manager of Operations
Street or P.O. Box: 2678 Route 18 South		
City: West Union	**State:** WV	**Zip:** 26456
Telephone Number: (304) 543-3077	**Cell Number:**	
E-mail address: caleb_raikes@tcenergy.com		
Environmental Contact: David J. Keatley PE, PhD		**Title:** Environmental Analyst USNG Environmental Compliance
Street or P.O. Box: 1700 MacCorkle Ave, SE, 5th Floor		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Cell Number:**	
E-mail address: david_keatley@tcenergy.com		
Application Preparer: Michael Dearing		**Title:** Project Manager
Company: Environmental Resources Management, Inc.		
Street or P.O. Box:		
City:	**State:**	**Zip:**
Telephone Number:	**Cell Number:**	
E-mail address: michael.dearing@erm.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Transmission		486210	4922

Provide a general description of operations.

Sherwood Compressor Station is a natural gas transmission and compressor facility covered by Standard Industrial Classification (SIC) Code 4922. The station has the potential to operate twenty-four (24) hours per day, seven (7) days per week, fifty-two (52) weeks per year.

The station consists of two (2) 15,427-hp Solar Mars 100 turbine compressor engines, two (2) 7,417-hp Solar Taurus 60 turbine compressor engines, one (1) 1,175-hp Waukesha VGF-P48GL emergency generator RICE, one (1) 0.80-MMBtu/hr fuel gas heater, one (1) 1.5-MMBtu/hr fuel gas heater, catalytic heaters with a total heat output of 2.88-MMBtu/hr, one (1) 1,000-gal wastewater storage tank, and one (1) 2,056-gal pipeline liquids storage tank.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR34)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS	☒ Section 112(d) MACT standards
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64)
☐ Cross-State Air Pollution Rule (45CSR43)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR 60 Subpart Dc – The proposed heaters are less than the 10 MMBtu/hr applicability threshold in §40 CFR 60.40c(a).

40 CFR 60 Subpart OOOO – The proposed units are not affected facilities listed under 40 CFR §60.5365.

☐ Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

- R13-3313D Condition 3.1.4: Do not discharge air pollutants which cause or contribute to an objectionable odor. [45CSR§4-3.1]
- R13-3313D Condition 3.3: Conduct stack tests as required and submit a report of the results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4: Facility-wide recordkeeping requirements.
- R13-3313D Condition 3.5: Facility-wide reporting requirements.

☐ Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

- R13-3313D Condition 3.3.1: Submit a protocol 30 days prior to testing and submit a report of all stack test results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4.1: Maintain records of all information required by the permit for at least five years.
- R13-3313D Condition 3.4.2: Maintain records of all odor complaints received, any investigation performed in response to such a complaint, and any responsive actions take [45CSR4]
- R13-3313D Condition 3.5.4: Submit a certified emissions statement and pay fees on an annual basis. [45CSR30]

Are you in compliance with all facility-wide applicable requirements? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

21. Active Permits/Consent Orders		
Permit or Consent Order Number	Date of Issuance MM/DD/YYYY	List any Permit Determinations that Affect the Permit *(if any)*
R13-3313	11/14/2016	
R13-3313A	12/18/2017	
R30-01700162-2020 (MM01)	05/11/2020	
R13-3313B	06/09/2022	
R13-3313C	06/19/2023	
R13-3313D	07/02/2024	
R30-01700162-2020 (MM02 and MM03)	09/03/2024	

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	238.58
Nitrogen Oxides (NO_X)	102.13
Lead (Pb)	-
Particulate Matter ($PM_{2.5}$)[1]	11.78
Particulate Matter (PM_{10})[1]	11.78
Total Particulate Matter (TSP)	11.78
Sulfur Dioxide (SO_2)	1.28
Volatile Organic Compounds (VOC)	23.35
Hazardous Air Pollutants[2]	Potential Emissions
Total HAPs	2.05
Formaldehyde	1.40
Regulated Pollutants other than Criteria and HAP	Potential Emissions
CO_2e	231,610.05

[1] $PM_{2.5}$ and PM_{10} are components of TSP.

[2] For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)		
☒	1.	Air compressors and pneumatically operated equipment, including hand tools.
☒	2.	Air contaminant detectors or recorders, combustion controllers or shutoffs.
☒	3.	Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
☒	4.	Bathroom/toilet vent emissions.
☒	5.	Batteries and battery charging stations, except at battery manufacturing plants.
☐	6.	Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
☐	7.	Blacksmith forges.
☐	8.	Boiler water treatment operations, not including cooling towers.
☐	9.	Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
☐	10.	CO_2 lasers, used only on metals and other materials which do not emit HAP in the process.
☒	11.	Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
☒	12.	Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
☒	13.	Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
☐	14.	Demineralized water tanks and demineralizer vents.
☐	15.	Drop hammers or hydraulic presses for forging or metalworking.
☐	16.	Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
☐	17.	Emergency (backup) electrical generators at residential locations.
☐	18.	Emergency road flares.
☐	19.	Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO_2, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis:

24. Insignificant Activities (Check all that apply)

☐ 20. Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27.

Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis:

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	lb/year
Pipeline Liquids Tank A01	0.07	0.29	<0.01	<0.01
Wastewater Tank A03	<0.01	<0.01	<0.01	<0.01
Totals	0.07	0.29	<0.01	<0.01

☐ 21. Environmental chambers not using hazardous air pollutant (HAP) gases.

☐ 22. Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.

☐ 23. Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.

☒ 24. Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.

☐ 25. Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.

☐ 26. Fire suppression systems.

☐ 27. Firefighting equipment and the equipment used to train firefighters.

☐ 28. Flares used solely to indicate danger to the public.

☐ 29. Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.

☐ 30. Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.

☐ 31. Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.

☐ 32. Humidity chambers.

☐ 33. Hydraulic and hydrostatic testing equipment.

☐ 34. Indoor or outdoor kerosene heaters.

☐ 35. Internal combustion engines used for landscaping purposes.

☐ 36. Laser trimmers using dust collection to prevent fugitive emissions.

☐ 37. Laundry activities, except for dry-cleaning and steam boilers.

☒ 38. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.

☐ 39. Oxygen scavenging (de-aeration) of water.

☐ 40. Ozone generators.

24. Insignificant Activities (Check all that apply)		
☐	41.	Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
☐	42.	Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
☐	43.	Process water filtration systems and demineralizers.
☐	44.	Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
☐	45.	Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
☐	46.	Routing calibration and maintenance of laboratory equipment or other analytical instruments.
☐	47.	Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
☐	48.	Shock chambers.
☐	49.	Solar simulators.
☐	50.	Space heaters operating by direct heat transfer.
☐	51.	Steam cleaning operations.
☐	52.	Steam leaks.
☐	53.	Steam sterilizers.
☐	54.	Steam vents and safety relief valves.
☐	55.	Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
☐	56.	Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
☒	57.	Such other sources or activities as the Director may determine.
☒	58.	Tobacco smoking rooms and areas.
☒	59.	Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**.
26. Emission Units
For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**.
For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**.
27. Control Devices
For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**.
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**.

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

Note: This Certification must be signed by a responsible official as defined in 45CSR§30-2.38.

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

Responsible official (type or print)	
Name: Caleb Raikes	Title: Manager of Operations

Responsible official's signature:

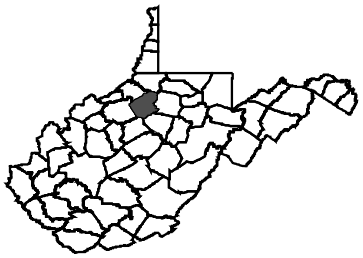
Signature: Caleb Raikes Digitally signed by Caleb Raikes Date: 2025.04.14 07:50:01 -04'00' Signature Date: _____

(Must be signed and dated in blue ink or have a valid electronic signature)

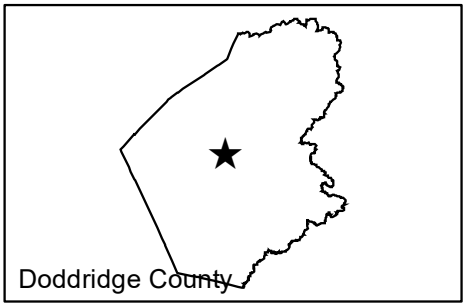
Note: Please check all applicable attachments included with this permit application:	
☒	ATTACHMENT A: Area Map
☒	ATTACHMENT B: Plot Plan(s)
☒	ATTACHMENT C: Process Flow Diagram(s)
☒	ATTACHMENT D: Equipment Table
☒	ATTACHMENT E: Emission Unit Form(s)
☐	ATTACHMENT F: Schedule of Compliance Form(s)
☐	ATTACHMENT G: Air Pollution Control Device Form(s)
☐	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s)

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

Attachment A
Area Map



West Virginia



0 1,000 2,000 4,000 Feet

N

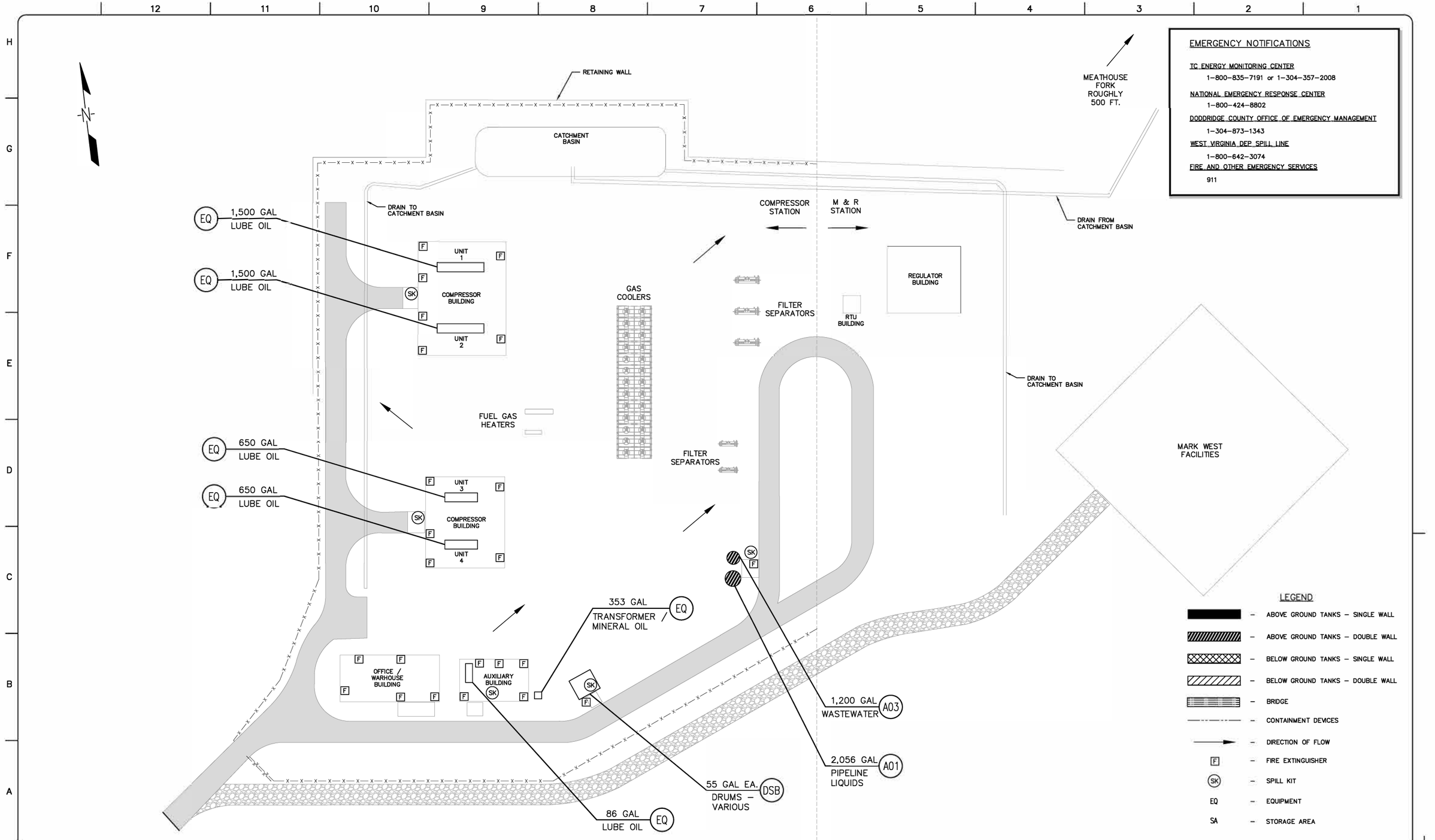
LAT. 39.269673 LON. -80.732527
DODDRIDGE COUNTY
WEST VIRGINIA

USGS 1:24K 7.5' Quadrangle:
Smithburg, WV

ERM	Sherwood Compressor Station 2678 WV Route 18 South Sherwood, West Virginia 26436	GIS Review: GM CHK'D: GM 0716980
Drawn By: SRV-05/05/2022	**Environmental Resources Management**	ATTACHMENT A

\\stddcfs02\data\Philadelphia\Team\DMMV\GIS\Projects\SiteLocationMaps\TC Energy_MXD\AttachmentB-SiteLocusMap_SherwoodCompressorStation_20220505.mxd - 5/5/2022|SRV

Attachment B
Plot Plan



EMERGENCY NOTIFICATIONS

TC ENERGY MONITORING CENTER
1–800–835–7191 or 1–304–357–2008

NATIONAL EMERGENCY RESPONSE CENTER
1–800–424–8802

DODDRIDGE COUNTY OFFICE OF EMERGENCY MANAGEMENT
1–304–873–1343

WEST VIRGINIA DEP SPILL LINE
1–800–642–3074

FIRE AND OTHER EMERGENCY SERVICES
911

LEGEND

- ABOVE GROUND TANKS – SINGLE WALL
- ABOVE GROUND TANKS – DOUBLE WALL
- BELOW GROUND TANKS – SINGLE WALL
- BELOW GROUND TANKS – DOUBLE WALL
- BRIDGE
- CONTAINMENT DEVICES
- DIRECTION OF FLOW
- F – FIRE EXTINGUISHER
- SK – SPILL KIT
- EQ – EQUIPMENT
- SA – STORAGE AREA

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
1	11/08/2023	CHANGED TITLE AND REPLACED A02 TANK DESIGNATION WITH A03. VOLUME CHANGED FROM 1500 TO 1200 GALLONS

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	LAG					

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

SHERWOOD COMPRESSOR STATION

FIA # | CHAINAGE: | DISCIPLINE #

PLOT PLAN – SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC)

SCALE | DRAWING No FD–C202–SPCC | REV 1

TIME: DESIGNFILE:

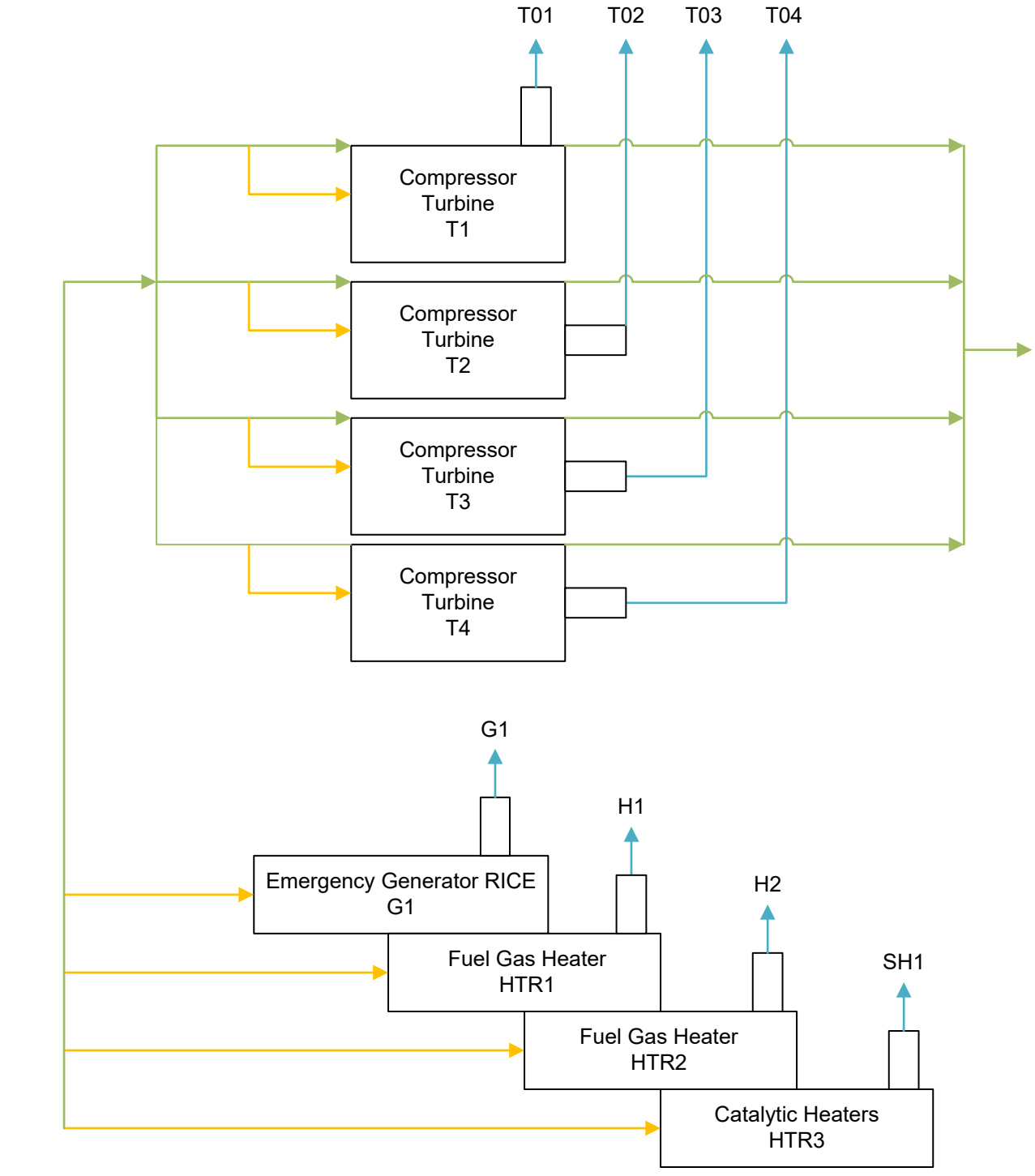
TC_JJD_BR_24x36.DWG 24X36

CADD DRAWING; DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ARCH D (24x36)

Attachment C
Process Flow Diagram

ATTACHMENT C
SHERWOOD COMPRESSOR STATION
PROCESS FLOW DIAGRAM



TC Energy

Attachment D
Equipment Table

Attachment D - Title V Equipment Table

(includes all emission units at the facility except those designated insignificant activities in Section 4, Item 24 of the General Forms

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
T1	T01	Compressor Turbine; Solar Taurus 60	2019	7,417 hp @ 32 °F	Existing	None
T2	T02	Compressor Turbine; Solar Taurus 60	2019	7,417 hp @ 32 °F	Existing	None
T3	T03	Compressor Turbine; Solar Mars 100	2024	15,427 hp @ 32 °F	Existing	None
T4	T04	Compressor Turbine; Solar Mars 100	2024	15,427 hp @ 32 °F	Existing	None
G1	G01	Waukesha VGF-P48GL Emergency Generator RICE	2019	1,175 hp	Existing	None
HTR1	H1	Fuel Gas Heater	2019	1.5 MMBtu/hr	Existing	None
HTR2	H2	Fuel Gas Heater	2019	0.8 MMBtu/hr	Existing	None
HTR3	SH1	Catalytic Heaters	2019	2.88 MMBtu/hr (total)	Existing	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment E
Emission Unit Forms

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T1, T2	Taurus 60 Turbine #1 Taurus 60 Turbine #2	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Taurus 60, Compressor Turbine #1

Natural gas-fired Solar Taurus 60, Compressor Turbine #2

Manufacturer: Solar	**Model number:** Taurus 60	**Serial number:**
Construction date: 02/25/2019 (in service)	**Installation date:** 02/25/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

7,417 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
66,904.7 scf/hr (based on 32°F)	586.09 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 68.24 MMBtu/hr (HHV, 32°F) 7,417 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 66,904.7 scf/hr; 586.09 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.74	38.94
Nitrogen Oxides (NO_X)	3.68	16.79
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.45	1.97
Particulate Matter (PM_{10})	0.45	1.97
Total Particulate Matter (TSP)	0.45	1.97
Sulfur Dioxide (SO_2)	3.90	0.21
Volatile Organic Compounds (VOC)	0.43	2.12
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.07	0.31
Formaldehyde	0.05	0.21
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	7,991.05	35,000.79

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 and 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

(6) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T3, T4	Mars 100 Turbine #3 Mars 100 Turbine #4	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Mars 100, Compressor Turbine #3

Natural gas-fired Solar Mars 100, Compressor Turbine #4

Manufacturer: Solar	**Model number:** Mars 100	**Serial number:**
Construction date: T3: 7/17/2024, T4: 10/9/2024 **(in service)**	**Installation date:** T3: 7/17/2024, T4: 10/9/2024 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

15,427 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
129,435 scf/hr (based on 32°F)	1,133.85 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 130.02 MMBtu/hr (HHV, 32°F) 15,427 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 129,435 scf/hr; 1,133.85 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	7.23	78.89
Nitrogen Oxides (NO_X)	7.12	32.51
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.87	3.82
Particulate Matter (PM_{10})	0.87	3.82
Total Particulate Matter (TSP)	0.87	3.82
Sulfur Dioxide (SO_2)	7.54	0.41
Volatile Organic Compounds (VOC)	0.83	4.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.13	0.59
Formaldehyde	0.09	0.41
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	15,459.58	67,712.97

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313d Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 & 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

(6) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
G1	Emergency Generator RICE	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired 4SLB Waukesha VGF-P48GL Emergency Generator RICE

Manufacturer: Waukesha	**Model number:** VGF-P48GL	**Serial number:**
Construction date: 04/10/2019 (in service)	**Installation date:** 04/10/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,175 HP

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
11,387 scf/hr	5.69 MMscf/yr	500 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 11.61 MMBtu/hr 1,175 HP	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 11,387 scf/hr; 5.69 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	4.14	1.04
Nitrogen Oxides (NO_X)	5.18	1.30
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	<0.01
Particulate Matter (PM_{10})	0.12	0.03
Total Particulate Matter (TSP)	0.12	0.03
Sulfur Dioxide (SO_2)	0.65	<0.01
Volatile Organic Compounds (VOC)	0.83	0.21
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.84	0.21
Formaldehyde	0.61	0.15
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	1,360.07	340.02

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, and CO: Vendor Data (20% of UHC for VOC)

$PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 3.2-2 (10/24) – 4SLB

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.2-2 (10/24) – 4SLB

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) Comply with 40 CFR 62 Subpart ZZZZ.

(2) R13-3313D Condition 6.1.1: Operating hours limited to 500 hours/year.

(3) R13-3313D Condition 6.1.2: Maximum emissions shall not exceed the following limits (tpy): NO_X - 1.30, CO - 2.59, VOC - 0.80.

(4) R13-3313D Condition 6.2.1: NO_X emissions shall not exceed 2.0 g/hp-hr or 160 ppm_{vd} at 15% O_2. CO emissions shall not exceed 1.0 g/hp-hr or 86 ppm_{vd} at 15% O_2 (excluding CH_2O emissions). [40 CFR §60.4233(e), Table I]

(5) 40 CFR 60 Subpart JJJJ work practice standards.

(6) 40 CFR 60 Subpart JJJJ notification requirements.

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) 40 CFR 63 Subpart ZZZZ; §63.6590(c)(1): Comply with NESHAP Subpart ZZZZ by complying with NSPS Subpart JJJJ.

(2) R13-3313D Condition 6.6.1: Maintain records of hours of operation including how many hours are spent for emergency operation, and reason for non-emergency operation. [40 CFR §50.4245(6)]

(2) R13-3313D Condition 6.3.1: Install a non-resettable hour meter. [40 CFR §60.4237(a)]

(3) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(4) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(5) R13-3313D Condition 6.4.1: Keep a maintenance plan and records of conducted maintenance as well as all notifications submitted. [40 CFR §60.4245(a)]

(6) R13-3313D Condition 6.6.1: Submit an initial notification within 30 days after construction. [40 CFR §60.4245(c)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR1	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1.5 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
1470.6 scf/hr	12.88 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 1.5 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 1470.6 scf/hr; 12.88 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.12	0.54
Nitrogen Oxides (NO_X)	0.15	0.64
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.01	0.05
Particulate Matter (PM_{10})	0.01	0.05
Total Particulate Matter (TSP)	0.01	0.05
Sulfur Dioxide (SO_2)	0.09	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.04
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	175.65	769.33

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR2	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

0.8 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 0.8 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.07	0.29
Nitrogen Oxides (NO_X)	0.08	0.34
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	0.02
Particulate Matter (PM_{10})	<0.01	0.02
Total Particulate Matter (TSP)	<0.01	0.02
Sulfur Dioxide (SO_2)	0.05	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.02
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	93.68	410.31

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR3	Catalytic Heaters	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Flameless Catalytic Heaters

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/30/2019 (in service)	01/30/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2.88 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 2.88 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.24	1.04
Nitrogen Oxides (NO_X)	0.28	1.24
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.02	0.07
Particulate Matter (PM_{10})	<0.01	0.02
Total Particulate Matter (TSP)	0.02	0.07
Sulfur Dioxide (SO_2)	0.16	<0.01
Volatile Organic Compounds (VOC)	0.02	0.07
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.02
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	337.24	1477.11

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A01	Pipeline Liquids Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

2,056 gallon pipeline liquids storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2,056 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	52,122 gal (12 times throughput of first 30 days of production)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	0.07	0.29
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	38.48	168.54

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A03	Wastewater Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

1,000 gallon wastewater storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,000 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	12,000 gal (12 turnovers)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	<0.01	<0.01
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	<0.01	0.01

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

Appendix A
Supplemental Calculations

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Facility Total PTE

Source	Annual Emissions															
	VOC		Total HAP		NO_x		CO		PM / $PM_{2.5}$ / PM_{10}		SO_2		CH_4		CO_2e	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.43	2.12	0.07	0.31	3.68	16.79	3.74	38.94	0.45	1.97	3.90	0.21	0.15	0.66	7,991.05	35,000.79
T02 - Solar Taurus 60 Turbine	0.43	2.12	0.07	0.31	3.68	16.79	3.74	38.94	0.45	1.97	3.90	0.21	0.15	0.66	7,991.05	35,000.79
T03 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	32.51	7.23	78.89	0.87	3.82	7.54	0.41	0.29	1.27	15,459.58	67,712.97
T04 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	32.51	7.23	78.89	0.87	3.82	7.54	0.41	0.29	1.27	15,459.58	67,712.97
G01 - Waukesha Emergency Generator RICE	0.83	0.21	0.84	0.21	5.18	1.30	4.14	1.04	0.12	0.03	0.65	<0.01	0.03	<0.01	1,360.07	340.02
H1 - Fuel Gas Heater	<0.01	0.04	<0.01	0.01	0.15	0.64	0.12	0.54	0.01	0.05	0.09	<0.01	<0.01	0.01	175.65	769.33
H2 - Fuel Gas Heater	<0.01	0.02	<0.01	<0.01	0.08	0.34	0.07	0.29	<0.01	0.05	0.05	<0.01	<0.01	<0.01	93.68	410.31
SH1 - Catalytic Heaters	0.02	0.07	<0.01	0.02	0.28	1.24	0.24	1.04	0.02	0.07	0.16	<0.01	<0.01	0.03	337.24	1,477.11
Insignificant Sources	0.07	0.29	<0.01	<0.01									1.37	6.00	38.48	168.55
Equipment Leaks (fugitive emissions)	0.27	1.18	<0.01	<0.01									21.77	95.37	609.79	2,670.87
Compressor Venting	0.17	0.76	<0.01	<0.01									14.07	61.65	394.16	1,726.44
Blowdowns	2.14	9.39	<0.01	<0.01									173.57	760.23	4,860.91	21,290.79
Proposed PTE[1]	**5.76**	**23.35**	**1.26**	**2.05**	**27.30**	**102.13**	**26.50**	**238.58**	**2.79**	**11.78**	**23.82**	**1.28**	**189.93**	**831.79**	**54,161.45**	**231,610.05**

Notes:
1. The facility PTE excludes fugitive emissions since transmission storage compressor stations are not one of the named source categories that include fugitive emissions under 45CSR30.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Facility Total HAPs Emissions

Source	Annual HAPs Emissions																							
	Total HAPs		Methanol		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene		2,2,4-Trimethylpentane		Acetaldehyde		Acrolein		1,3-Butadiene	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.07	0.31			0.05	0.21			<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T02 - Solar Taurus 60 Turbine	0.07	0.31			0.05	0.21			<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T03 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.08	<0.01	0.02	<0.01	0.04			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
T04 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.08	<0.01	0.02	<0.01	0.04			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
G01 - Waukesha Emergency Generator RICE	0.84	0.21	0.03	<0.01	0.61	0.15	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	0.02	0.06	0.01	<0.01	<0.01
H1 - Fuel Gas Heater	<0.01	0.01			<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01												
H2 - Fuel Gas Heater	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
H3 - Catalytic Heaters	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
Insignificant Sources	<0.01	<0.01					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01						
Equipment Leaks (fugitive emissions)	<0.01	<0.01																						
Compressor Venting	<0.01	<0.01																						
Blowdowns	<0.01	<0.01																						
Proposed PTE[1]	**1.26**	**2.05**	**0.03**	**<0.01**	**0.90**	**1.40**	**0.02**	**0.02**	**<0.01**	**0.02**	**0.06**	**0.23**	**0.01**	**0.06**	**0.03**	**0.11**	**<0.01**	**<0.01**	**0.11**	**0.09**	**0.06**	**0.03**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Taurus 60 Turbine (T01 - T02)

Horsepower	7,417	HP at 32°F	
Brake Specific Fuel Consumption	8,289	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	61.48	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	68.24	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	586.09	MMscf/yr	
	66,905	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x (15 ppmvd)		0.060	LHV	3.68	16.79	Vendor Data
CO (25 ppmvd)		0.061	LHV	3.74	38.94	Vendor Data
PM_{10}	5.64E-05	0.0066	HHV	0.45	1.97	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$	5.64E-05	0.0066	HHV	0.45	1.97	AP-42 Table 3.1-2a (4/00)
VOC (5 ppmvd)		0.007	LHV	0.43	2.12	Vendor Data (20% of UHC)
SO_2 (Maximum Hourly)	4.73E-04	0.0571	HHV	3.90		20 grains S / 100 scf
SO_2 (Average Annual)	5.92E-06	0.000714	HHV		0.21	0.25 grains S / 100 scf
CO_2	0.97	116.98		7,982.85	34,964.87	40 CFR Subpart C
CH_4	1.83E-05	2.20E-03		0.15	0.66	40 CFR Subpart C
N_2O	1.83E-06	2.20E-04		0.02	0.07	40 CFR Subpart C
Benzene	9.95E-08	1.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.08E-06	1.30E-04	HHV	<0.01	0.04	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.65E-07	3.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.32E-07	4.00E-05	HHV	<0.01	0.01	AP-42 Table 3.1-3 (4/00)
Acrolein	5.30E-08	6.40E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.89E-06	7.10E-04	HHV	0.05	0.21	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.56E-09	4.30E-07	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	1.08E-08	1.30E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.82E-08	2.20E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.40E-07	2.90E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Xylenes	5.30E-07	6.40E-05	HHV	<0.01	0.02	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	7,991.05	35,000.79	40 CFR 98 Subpart C
Total HAPs			0.00102	0.07	0.31	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating)
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors
- AP-42, Chapter 3.1 Table 3.1-2a and 3.1-3 references are from the April 2000 revision
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Taurus 60 (T01 - T02) - Emissions from Venting

Number of Pneumatic Actuators:	15	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	55,489	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8,760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	90.00	80.44	0.17	3.41	0.02	14.91	0.09	417.69	0.18	<0.01
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.25	<0.01
							Total:	974.60	0.43	<0.01

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
7. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Taurus 60 (T01 - T02) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	3.68	3.74	0.43
Low Temp (<0 °F)[2]	lb/hr	10.75	15.58	0.89
Low-Load (<50%)[3]	lb/hr	8.50	344.95	3.94
Startup / Shutdown[4]	lb/event	1.10	97.30	1.12

Notes:
1. Based on data from Solar Taurus 60 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8,507	15.67	15.89	1.82
Low Temp (<0 °F)		120	0.65	0.94	0.05
Low-Load (<50%)		100	0.43	17.25	0.20
Startup/ Shutdown	100	33	0.06	4.87	0.06
Total		8,760	16.79	38.94	2.12

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T01, T02 / Solar Taurus 60	0.23	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Mars 100 Turbine (T03 - T04)

Horsepower	15,427	HP at 32°F	
Brake Specific Fuel Consumption	7,710	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	118.94	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	132.02	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	1,133.85	MMscf/yr	
	129,435	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x (15 ppmvd)		0.0600	LHV	7.12	32.51	Vendor Data
CO (25 ppmvd)		0.0610	LHV	7.23	78.89	Vendor Data
PM_{10}	5.64E-05	0.0066	HHV	0.87	3.82	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$	5.64E-05	0.0066	HHV	0.87	3.82	AP-42 Table 3.1-2a (4/00)
VOC (5 ppmvd)		0.007	LHV	0.83	4.16	Vendor Data
SO_2 (Maximum Hourly)	4.40E-04	0.0571	HHV	7.54		20 grains S / 100 scf
SO_2 (Average Annual)	5.50E-06	0.000714	HHV		0.41	0.25 grains S / 100 scf
CO_2	0.90	116.98		15,443.72	67,643.49	40 CFR Subpart C
CH_4	1.70E-05	2.20E-03		0.29	1.27	40 CFR Subpart C
N_2O	1.70E-06	2.20E-04		0.03	0.13	40 CFR Subpart C
Benzene	9.25E-08	1.20E-05	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.00E-06	1.30E-04	HHV	0.02	0.08	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.47E-07	3.20E-05	HHV	0.00	0.02	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.08E-07	4.00E-05	HHV	0.01	0.02	AP-42 Table 3.1-3 (4/00)
Acrolein	4.93E-08	6.40E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.47E-06	7.10E-04	HHV	0.09	0.41	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.32E-09	4.30E-07	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	1.00E-08	1.30E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.70E-08	2.20E-06	HHV	0.00	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.24E-07	2.90E-05	HHV	0.00	0.02	AP-42 Table 3.1-3 (4/00)
Xylenes	4.93E-07	6.40E-05	HHV	0.01	0.04	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	15,459.58	67,712.97	40 CFR 98 Subpart C
Total HAPs			0.00102	0.13	0.59	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating)
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors
- AP-42, Chapter 3.1 Table 3.1-2a and 3.1-3 references are from the April 2000 revision
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8,760 hr/yr
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Mars 100 (T03 - T04) - Emissions from Venting

Number of Pneumatic Actuators:	7	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	95,620	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8,760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	42.00	37.54	0.08	1.59	0.01	6.96	0.04	194.92	0.09	<0.01
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.25	<0.01
							Total:	751.84	0.33	<0.01

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
7. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Solar Mars 100 (T03 - T04) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	7.12	7.23	0.83
Low Temp (<0 °F)[2]	lb/hr	21.12	30.60	1.75
Low-Load (<50%)[3]	lb/hr	16.10	653.41	7.47
Startup/ Shutdown[4]	lb/event	3.10	272.70	3.12

Notes:
1. Based on data from Solar Mars 100 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8,507	30.28	30.75	3.53
Low Temp (<0 °F)		120	1.27	1.84	0.11
Low-Load (<50%)		100	0.81	32.67	0.37
Startup/ Shutdown	100	33	0.16	13.64	0.16
Total		8,760	32.51	78.89	4.16

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T03, T04 / Solar Mars 100	0.21	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Waukesha VGF-P48GL Emergency Generator RICE (G1)

Horsepower	1,175	HP
Brake Specific Fuel Consumption	9,885	Btu/Bhp-hr
Total Heat Input	11.61	MMBtu/hr
Operating Hours	500	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	5.69	MMscf/yr
	11,387.13	scf/hr
Quantity	1	

Pollutant	Emission Factor	Emission Factor Units	Emission Rate		Emission Factor Reference
			lb/hr	ton/yr	
NO_x	2.00	g/bhp-hr	5.18	1.30	Vendor Data
CO	1.60	g/bhp-hr	4.14	1.04	Vendor Data
PM Filterable	7.71E-05	lb/MMBtu	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
PM Condensable	9.91E-03	lb/MMBtu	0.12	0.03	AP-42 Table 3.2-2 (10/24) - 4SLB
VOC	0.32	g/bhp-hr	0.83	0.21	Vendor Data
SO_2 (Maximum Hourly)	20	grains S / 100 ft^3	0.65		AP-42 Chapter 5.3
SO_2 (Average Annual)	0.25	grains S / 100 ft^3		<0.01	AP-42 Chapter 5.3
CO_2	116.977	lb/MMBtu	1,358.67	339.67	40 CFR Subpart C
CH_4	0.002205	lb/MMBtu	0.03	<0.01	40 CFR Subpart C
N_2O	0.000220	lb/MMBtu	0.00	<0.01	40 CFR Subpart C
1,3-Butadiene	2.67E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Methanol	2.50E-03	lb/MMBtu	0.03	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Hexane	1.11E-03	lb/MMBtu	0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Benzene	4.40E-04	lb/MMBtu	0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Toluene	4.08E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Ethylbenzene	3.97E-05	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Acetaldehyde	8.36E-03	lb/MMBtu	0.10	0.02	AP-42 Table 3.2-2 (10/24) - 4SLB
Acrolein	5.14E-03	lb/MMBtu	0.06	0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Xylene	1.84E-04	lb/MMBtu	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Formaldehyde	5.28E-02	lb/MMBtu	0.61	0.15	AP-42 Table 3.2-2 (10/24) - 4SLB
CO_2e		117.1	1,360.07	340.02	40 CFR 98 Subpart C
Total HAPs		0.07219	0.84	0.21	AP-42 Table 3.2-2 (10/24) - 4SLB

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2-2 references are from the October 2024 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 500 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Example Calculations:
Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x BSFC **(Btu/hp-hr)** ÷ 1,000,000 x Engine Rating **(bhp)**
Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(g/bhp-hr)** x Engine Rating **(hp)** x (1 **lb**/453.6 **g**)
Maximum Hourly Emissions SO_2 Caclulation (lb/hr) = (0.25 grain S / 100ft^3) * Fuel throughput (ft^3 / hr) * (1lb / 7000 grains) * (lbmol S / 32.06 lb S) * (lbmol SO_2 / lbmol S) *(64.07 lb SO_2 / lbmol SO_2)

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Fuel Gas Heater (H1)

Heat Input	1.50	MMBtu/hr
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	12.88	MMscf/yr
	1,470.59	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.15	0.64	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.12	0.54	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.04	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.09		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	175.47	768.54	40 CFR Subpart C
CH_4		0.002205	<0.01	0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	175.65	769.33	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025).
  GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Fuel Gas Heater (H2)

Heat Input	0.80	MMBtu/hr
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	6.87	MMscf/yr
	784.3	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.08	0.34	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.07	0.29	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	<0.01	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.05		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	93.58	409.89	40 CFR Subpart C
CH_4		0.002205	<0.01	<0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	93.68	410.31	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	<0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025).
  GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Catalytic Heaters (SH1)

Heat Input	2.880	MMBtu/hr (total)
Operating Hours	8,760	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	24.73	MMscf/yr
	2,823.53	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.28	1.24	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.24	1.04	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	0.02	0.07	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.02	0.07	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.16		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	336.89	1475.60	40 CFR Subpart C
CH_4		0.002205	<0.01	0.03	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.02	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	337.24	1477.11	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.02	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (effective January 2025).

GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Fugitive Emissions from Leaks

Number of Compressors: 4

Component	Facility Components	Estimated Leaking Components[2]	Emission Factor[3]	Fugitive Emissions							
				Total	CH_4[4]	CO_2[4]	CH_4[5]	CO_2[5]	CO_2e[6]	VOC[7]	HAPs[8]
			scf/hr / component	scf/yr	scf/yr	scf/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service											
Valve	515	11	9.6	925056.00	826833.28	1764.94	17.50	0.10	490.09	0.22	<0.01
Connector	1074	22	4.9	944328.00	844058.97	1801.71	17.86	0.10	500.30	0.22	<0.01
Open-Ended Line	0	0	6.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01
Pressure Relief Valve	10	1	7.8	68328.00	61072.91	130.36	1.29	<0.01	36.20	0.02	<0.01
Meter	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Other	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Non-Compressor Service											
Valve	559	12	9.6	1,009,152.00	901,999.94	1,925.39	19.09	0.11	534.64	0.24	<0.01
Connector	1724	35	4.9	1,502,340.00	1,342,821.09	2,866.36	28.42	0.17	795.92	0.35	<0.01
Open-Ended Line	0	0	6.9	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	0.00	<0.01
Pressure Relief Valve	13	1	7.8	273,312.00	244,291.65	521.46	5.17	0.03	144.80	0.06	<0.01
Meter	8	1	9.1	318,864.00	285,006.92	608.37	6.03	0.04	168.93	0.07	<0.01
Other	18	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
						Total:	95.37	0.56	2,670.87	1.18	<0.01

Notes:

1. Estimated component leaks per compressor based on average measurements throughout the Columbia pipeline system.
2. Estimated number of leaking components utilizing a 2% component leak rate factor throughout the Columbia pipeline system obtained from fugitive leak survey results at Columbia facilities, and rounded up to the nearest integer.
3. Emission factors from 40 CFR 98 Subpart W Table W-2 (Updated April 2024 and effective January 2025).
4. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in Sherwood natural gas data.
5. Conversion based on densities of GHG as provided in 40 CFR 98.233(v).
6. Based on 40 CFR 98 Subpart A Global Warming Potentials (effective January 2025).
7. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
8. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Blowdown Emissions

Component	Emission Rate (ton/yr)				
	CH_4 [1]	CO_2	CO_2e	VOC [2]	HAPs [3]
Equipment Blowdowns	655.74	3.83	18,364.63	8.10	<0.01
Pigging Blowdowns	17.65	0.10	494.42	0.22	<0.01
Station Emergency Shutdown	86.83	0.51	2,431.74	1.07	<0.01
Blowdown, Total	760.23	4.45	21,290.79	9.39	<0.01

Notes:
1. CH_4 emission rates based on 89.38 vol% CH_4 in annualized Sherwood natural gas data
2. Based on a 4.46E-03 mol ratio of VOC to methane as calculated from Sherwood gas composition data.
3. Based on a 1.13E-06 ratio of HAPs to methane as calculated from Sherwood gas composition data.

Sherwood Facility Wide Emergency Shutdown (ESD) PTE Emission Calculations
Blowdown Emissions per Event (mscf/event): 2,295.0
Blowdown Events per Year: 2

Parameter	Gas Loss from ESD (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
ESD Emissions	4,590.0	4,102.63	8.76	86.83	0.51	2,431.74	1.07	0.001

Notes:
- Gas loss volume based on TC Energy Engineering Department calculations using estimated facility piping volume, the average suction pressure, and discharge at MAOP. This volume would also be used when reporting ESD gas loss events at Sherwood to PHMSA.

Compressor Startup/Shutdown PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
Unit 1-2	100	216.0	21,600	19,307	41.21	408.61	2.39	11,443.46	5.05	<0.01
Unit 3-4	100	104.0	10,400	9,296	19.84	196.74	1.15	5,509.81	2.43	<0.01
Filter Separators A-C	9	264.0	2,376	2,124	4.53	44.95	0.26	1,258.78	0.56	<0.01
Filter Separators D-E	6	48.0	288	257	0.55	5.45	0.03	152.58	0.07	<0.01
Total	--	--	34,664	30,983	66.14	655.74	3.83	18,364.63	8.10	<0.01

Pigging PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
LR9003 (30" x 24" Barrel) L&R	12	12.21	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LR9002 (42" x 36" Barrel) L&R	12	35.11	421	377	0.80	7.97	0.05	223.21	0.10	<0.01
LR9002 (42" x 36" Barrel) L&R	12	42.66	512	458	0.98	9.68	0.06	271.21	0.12	<0.01
Total	--	--	933	834	1.78	17.65	0.10	494.42	0.22	<0.01

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Natural Gas Composition

Representative Composition of Natural Gas

Natural Gas Composition	Molar Fraction[1] (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
Nitrogen	0.48	28.01	0.1339	0.7605
Carbon Dioxide	0.19	44.01	0.0840	0.4769
Methane	89.38	16.04	14.3395	81.4432
Ethane	9.55	30.07	2.8723	16.3135
Propane	0.39	44.10	0.1731	0.9831
iso-Butane	0.0026	58.12	0.0015	0.0086
n-Butane	0.0022	58.12	0.0013	0.0073
iso-Pentane	0.0006	72.15	0.0004	0.0025
n-Pentane	0.0005	72.15	0.0004	0.0022
C_{6+} Components	0.0004	89.09	0.0004	0.0023
Total	100.00	-	17.61	100.00

C_{6+} HAP Composition[2]	Molar Fraction (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
2,2,4-Trimethylpentane	4.98E-06	114.23	5.69E-06	3.23E-05
Benzene	5.43E-06	78.11	4.24E-06	2.41E-05
Ethylbenzene	2.24E-07	106.17	2.38E-07	1.35E-06
n-Hexane	8.45E-05	86.18	7.29E-05	4.14E-04
Toluene	3.64E-06	92.14	3.35E-06	1.90E-05
Xylenes	1.80E-06	106.17	1.91E-06	1.08E-05
Total HAPs	1.01E-04	-	8.83E-05	5.01E-04

Totals	Mol %	Weight %
Total VOCs	0.40	1.01
Total HAPs	1.01E-04	5.01E-04

Ratios	Mol	Weight
VOC / Methane Ratio	4.46E-03	1.24E-02
HAPs / Methane Ratio	1.13E-06	6.16E-06

Mass Fraction Conversion Data

Compound	Mol Weight (g/mol)	Mass in Gas Sample (g)	Weight %	Mass %
CO_2	44.01	8.40	0.0048	0.4770
N_2	28.02	13.39	0.0076	0.7607
Methane	16.04	1433.69	0.8144	81.4400
Ethane	30.07	287.23	0.1632	16.3159
Propane	44.09	17.31	0.0098	0.9831
I-Butane	58.12	0.15	0.0001	0.0086
N-Butane	58.12	0.13	0.0001	0.0073
I-Pentane	72.15	0.04	0.0000	0.0025
N-Pentane	72.15	0.04	0.0000	0.0022
Other hexanes	86.18	0.04	0.0000	0.0022
n-hexane	86.18	0.01	0.0000	0.0004
2,2,4 - Trimethylpentane	114.23	0.00	0.0000	0.0000
Benzene	78.11	0.00	0.0000	0.0000
Toluene	92.14	0.00	0.0000	0.0000
Ethylbenzene	106.17	0.000	0.0000	0.0000
Xylenes	106.17	0.00	0.0000	0.0000

Notes:

1. Natural gas analysis obtained from gas chromatograph readings from site data sheet.
2. C_{6+} HAP composition molar fractions were derived from the GRI-GLYCALC v4.0 C_{6+} analysis multipliers for the Natural Gas Transmission Industry Segment.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Insignificant Sources Emissions

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	ton/year
A01 - Pipeline Liquids Tank	0.07	0.29	<0.01	<0.01
A03 - Wastewater Tank	<0.01	<0.01	<0.01	<0.01
Totals	**0.07**	**0.29**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Pipeline Liquids Tank A01 - Insignificant Source

Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
CH_4	1.37	6.00
CO_2	0.15	0.65
Propane	0.05	0.21
Isobutane	0.01	0.06
n-Butane	<0.01	0.02
Isopentane	<0.01	<0.01
n-Pentane	<0.01	<0.01
Hexane	<0.01	<0.01
Heptane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
C_{6+}	<0.01	<0.01
VOCs	0.07	0.29
Total HAPs	<0.01	<0.01
CO_2e	38.48	168.54

Notes:
- Tank emission rates were calculated using Promax software. Promax output emissions are attached.
- Emission profiles shown above are for one (1) 2,056 gallon Condensate Tanks with 12 Turnovers per year.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source

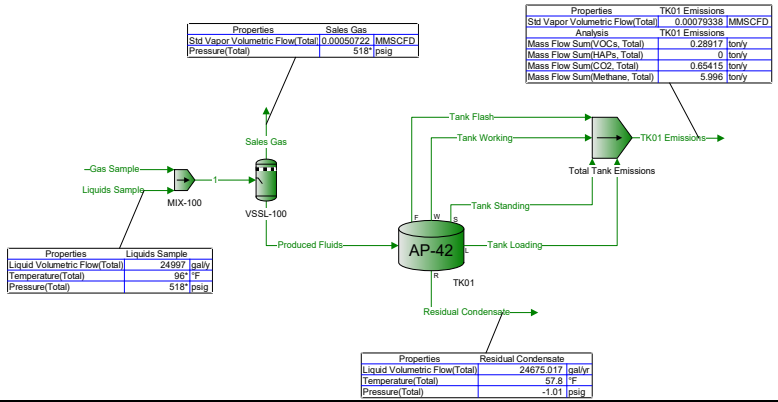
Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
CH_4	<0.01	<0.01
CO_2	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
n-Hexane	<0.01	<0.01
2,2,4-Trimethylpentane	<0.01	<0.01
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01
CO_2e	0.00	0.01

Notes:
- Tank emission rates were calculated using Promax software.
- Emission profiles shown above are for one (1) 1,000 gallon Condensate Tank with 12 Turnovers per year.

2056 gal
Plant Schematic

Client Name:	TC Energy	Job: Condensate Tank Emissions
Location:	Sherwood Station	
Flowsheet:	2056 gal	

TC Energy
Sherwood Station
TK01 Condensate Tank Emissions



* User Specified Values
? Extrapolated or Approximate Values

Columbia Gas Transmission, LLC Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Assumptions

	Wastewater Tank
Capacity (gal)	1,000
Turnovers	12
Composition	100% Mineral Oil
Location	Charleston, WV
Height	3.49118433
Diameter	6.98236866

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source Emission
Master Calculations - Fixed Roof Tanks

Tank ID	Storage Tank Paramenters										
	Vessel Type	Diameter D (ft)	Straight Side (ft)	Roof Height (ft)	Effective Tank Height (ft)	Void Volume (gal)	Maximum Working Volume (gal)	Isothermal Yes/No	Conservation Vent Low (psig)	Conservation Vent High (psig)	Paint Solar Absorptance dimensionless
Wastewater Tank A03	Horizontal Storage	6.9824	3.4912	N/A	N/A	1000	1000	Normal	-0.03	0.03	0.25

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Material Stored			Annual Standing Storage Losses (Uncontrolled)				
	Material Type	Material Name	Composition Reference	Vapor Space Vv (ft^3)	Vapor Density Wv (lb/ft^3)	Vapor Space Expansion Factor KE dimensionless	Vented Vapor Saturation Factor Ks dimensionless	VOC Standing Losses Ls (lb/yr)
Wastewater Tank A03	Compound	Mineral Oil (White)	composition link	66.8856	0.001633333	0.037708333	0.993166667	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Annual Working Losses (Uncontrolled)							
	Tla (°F)	Vapor Molecular Weight Mv (lb/lb-mole)	VP at Tla Pva (psia)	Throughput Q (gal/yr)	 Q (bbl/yr)	Turnover Factor Kn dimensionless	Crude Oil Factor Kp dimensionless	Working Losses VOC Lw (lb/yr)
Wastewater Tank A03	57.10931667	194.27	0.04715833	12000	285.7143	1	1	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Loading Operation			Annual Emissions		Annual Emissions	
	Pump-In Rate (gph)	VOC Rate Uncontrolled (lb/hr)	VOC Rate Controlled (lb/hr)	Uncontrolled VOC (lb)	Controlled VOC (lb)	Uncontrolled VOC (tpy)	Controlled VOC (tpy)
Wastewater Tank A03				0.000	0	0.000	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - April 2025
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Wastewater Tank

Activity Title	Wastewater emissions
Climate	West Virginia, Charleston
pa	14.2535 psia
Equipment Tag	Wastewater Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Normal Storage Tank (11/2019 Rev.)

Working and Breathing Loss Calculation	
Void Space Volume	1000 gal
Working Volume	1000 gal
Working Volume	133.6806 ft^3
Shell Diameter	6.9824 ft
Straight Side Height	3.4912 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0.03
pbv	-0.03
Equipment Comment	
Activity Comment	
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents	500.000 gal	20.000 °C	3429.959 lb		17.656 lb-M	

Mixture Name:	Mixture						
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
	Mineral Oil (White)	2.1714	3429.9594	1	17.6556	1	1	2.1714

Kp (product factor)	1

Month		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		
Q	(gal)	1016.3934	950.8197	1016.393	983.6066	1016.393	983.6066	1016.3934	1016.393	983.6066	1016.393	983.6066	1016.393	12000	(sum)
Vq	(ft^3)	135.872	127.1061	135.872	131.4891	135.872	131.4891	135.872	135.872	131.4891	135.872	131.4891	135.872	1604.167	(sum)
N (period)	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
N (scaled to annual)	(number)	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	143.6064	(sum)
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(avg)
Days	(number)	31	29	31	30	31	30	31	31	30	31	30	31	366	(sum)
Compound Molecular Weights (lb/lb-M)															
Mineral Oil (White)	(Mv)	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	(lb/lb-mole)
Compound Vapor Pressures (Pva)															
Mineral Oil (White)	(mmHg)	2.1714	2.1714	2.1714	2.1714	2.1714	2.9375	3.5041	3.2718	2.1714	2.1714	2.1714	2.1714	2.438	(avg)
Working Loss Calculations (Uncontrolled)															
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(average)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(average)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(average)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(average)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(average)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(average)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(average)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(average)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(average)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(average)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
n	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
Compound Vapor Density (vW(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Working Losses (Lw)															
Air	(lb)	10.5746	9.8171	10.2683	9.7543	9.9042	9.4283	9.6721	9.7009	9.5222	10.0677	9.9353	10.4738	119.1188	(sum)
Mineral Oil (White)	(lb)	0.2094	0.1943	0.2031	0.1929	0.1958	0.2523	0.3091	0.2894	0.1883	0.1992	0.1967	0.2074	2.6379	(sum)
Breathing Loss Calculations (Uncontrolled)															
tan	(°R)	482.67	485.37	494.67	502.47	511.17	519.47	524.07	523.07	516.17	503.87	495.97	487.67	503.8867	(avg)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(avg)
tax	(°R)	500.87	504.97	516.37	526.47	535.17	542.77	545.37	544.07	538.47	527.87	516.97	505.67	525.42	(avg)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(avg)
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(avg)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(avg)
i	(Btu/ft²day)	625.9737	850.2836	1184.686	1514.647	1780.202	1910.6	1836.9933	1675.503	1369.972	1046.039	678.9578	533.0136	1250.573	(avg)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(avg)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(avg)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
dPv	(psia)	0	0	0	0	0.0093	0.0352	0.038	0.0364	0.0176	0	0	0	0.011375	(avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	(avg)
dTv	(°R)	15.8699	17.9714	21.1134	24.3732	25.701	25.863	24.095	23.0775	22.4599	22.0302	18.0948	15.2651	21.3262	(avg)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(avg)
ks	(number)	0.9939	0.9939	0.9939	0.9939	0.9939	0.9918	0.9902	0.9909	0.9939	0.9939	0.9939	0.9939	0.993167	(avg)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(avg)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(avg)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(avg)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(avg)
plx	(psia)	0.042	0.042	0.042	0.042	0.0513	0.0772	0.0868	0.0815	0.0596	0.042	0.042	0.042	0.0542	(avg)
pln	(psia)	0.042	0.042	0.042	0.042	0.042	0.042	0.0488	0.0451	0.042	0.042	0.042	0.042	0.042825	(avg)
Compound Vapor Density (wV(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Breathing Losses (Ls)															
Air	(lb)	4.5151	4.7889	5.8571	6.3885	6.8431	6.7124	6.3834	6.1225	5.7289	5.8899	4.7644	4.2287	68.2229	(sum)
Mineral Oil (White)	(lb)	0.0889	0.0942	0.1152	0.1256	0.1344	0.1782	0.202	0.181	0.1126	0.1158	0.0938	0.0832	1.5249	(sum)
Total Losses (Lt)															
Air	(lb)	15.0897	14.6059	16.1254	16.1428	16.7472	16.1406	16.0555	15.8234	15.2511	15.9576	14.6997	14.7026	187.3415	(sum)
Mineral Oil (White)	(lb)	0.2982	0.2885	0.3183	0.3184	0.3302	0.4305	0.5111	0.4704	0.301	0.3151	0.2905	0.2906	4.1628	(sum)

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Permit Renewal - Sherwood Compressor Station

David Keatley <david_keatley@tcenergy.com> Thu, Apr 3, 2025 at 2:17 PM
To: "Barron, Sarah K" <sarah.k.barron@wv.gov>

Sarah,

Attached is the response. I will get you an updated application soon.

David J. Keatley PE, PhD

Environmental Analyst

USNG Environmental Compliance

Email: david_keatley@tcenergy.com

Desk: (304) 357-2443

1700 Maccorkle Ave, SE

5th Floor

Charleston, WV

25314

TC Energy

TCEnergy.com

From: Barron, Sarah K <sarah.k.barron@wv.gov>
Sent: Wednesday, March 19, 2025 2:33 PM

To: David Keatley <david_keatley@tcenergy.com>
Subject: [EXTERNAL] Title V Permit Renewal - Sherwood Compressor Station

[Quoted text hidden]

Sherwood Response.docx
29K

Answers in red are TC Energy responses to WV DEP questions in black.

1) The following discrepancies need to be addressed in the emission unit specifications and the emission calculations:
   a) Turbines:
      i) In the current NSR and Title V permits, the horsepower rating of T01/T02 is limited to 7,417 hp, but, in this application, the rating was increased to 7,684 hp. Similarly, the horsepower rating of T03/T04 is currently limited to 15,427 hp, but the rating was increased to 15,900 hp in the renewal application. What are the reasons for these changes?
         (1) This has been updated to match the previous Title V Permit Application.
      ii) In the PTE calculations for the turbines:
         (1) When compared to the applications for R13-3313 and the initial Title V permit, the emission factors (in terms of lbs/mmBTU) used to calculate the turbines' emissions of NOx, CO, and VOCs have increased. However, the turbines' hourly potential emissions for these pollutants were not revised. Why have the emission factors changed?
            (a) Emission factors from previous Title V were in LHV, the new calc workbook for 2025 Title V renewal has them in HHV. HHV = LHV*1.11. The revision of these factors did not impact emissions for NO_x, CO, or VOC because we pull emission rates from the different operating modes provided by Solar. We updated these emission factors to be in LHV to match the previous Title V Permit Application.
         (2) T01/T02: The annual potential emissions of NOx, CO, and VOCs reported in this renewal application are lower than the potential emissions currently permitted for each turbine.
            (a) This has been fixed. The hours were wrong, updated to match previous Title V.
         (3) T03/T04: The annual potential emissions of CO reported in this renewal application are higher than the annual potential emissions currently permitted for each turbine; and the annual potential emissions of NOx reported in this renewal application are lower than the potential emissions currently permitted for each turbine.
            (a) This has been fixed. The hours were wrong, updated to match previous Title V.
         (4) The changes to the annual PTE of NOx, CO, and VOCs appear to be due to revisions of the amount of time that the turbines are assumed to spend in each operating mode. Are these updated hours of operation accurate?
            (a) No, those are not correct. This has been fixed. The hours were wrong, updated to match previous Title V.

(5) The annual potential emissions of PM from T01/T02 have decreased by 0.07 tpy, and the annual potential emissions of PM from T03/T04 have increased by 0.11 tpy. What is the reason for this change?

(a) This has been fixed. The horsepower rating was wrong, so fixing that made it the same as previous Title V.

b) Emergency Generator: The potential CO and VOC emissions from the emergency generator G1 were updated with R13-3313C and R30-01700162-2020 (MM02). With these revisions, the emission standards associated with Subpart JJJJ were used to calculate the PTE and to set the emission limits for the generator. However, in this renewal application, it appears that the lower emission factors from the engine manufacturer were used to calculate the generator's potential CO, NOx, and VOC emissions. Please update the emission calculations to reflect the permitted PTE/limits.

i) This has been fixed.

c) The potential emissions of VOCs and HAPs from the equipment leaks, compressor venting, and blowdowns were revised in this renewal application. Why did the potential VOC emissions from these emission points increase? Why did the potential HAP emissions decrease?

i) The emissions for VOCs and HAPs from equipment leaks, compressor venting, and blowdowns have been revised to better match the previous Title V Permit Application.

ii) Fugitive component counts have been updated, so the VOC tpy has increased from 0.29 tpy to 1.18 tpy.

iii) Additionally, discrepancies in VOCs and HAPs from equipment leaks, compressor venting, and blowdowns are partly due to an updated gas composition at the station resulting in changes in the VOC/methane and HAP/methane ratios. This has resulted in the VOC emissions for compressor venting and blowdowns to decrease by 0.16 and 0.24, respectively. See yellow highlights below for the changes:

(1) Previous Title V Ratios:

VOC:	0.4418	1.1852
	0.00508400	
VOC/Methane Ratio:	5	0.015311
HAP/Methane Ratio:	0.00016916	0.00090876

(2) New Title V Ratios:

Ratios	Mol	Weight
VOC / Methane Ratio	4.46E-03	1.24E-02
HAPs / Methane Ratio	1.13E-06	6.16E-06

2) The WV DAQ received notices that the turbines T03 and T04 were to be replaced with like-kind units. Has the replacement of these turbines been completed? If so, what are the construction/installation dates of the replacement turbines?
   a) Unit 4 was in service 10/9/2024 and unit 3 was in service 7/17/2024.
3) The city and zip code of the facility's physical address in the application is different to the address in the current operating permit. Please confirm the street address, city, and zip code of the facility.
   a) This has been updated in the new application. The address in the previous Title V application is correct.

Barron, Sarah K <sarah.k.barron@wv.gov>

Title V Permit Renewal - Sherwood Compressor Station

Barron, Sarah K <sarah.k.barron@wv.gov> Wed, Mar 19, 2025 at 2:32 PM
To: David Keatley <david_keatley@tcenergy.com>

David Keatley,

I have several questions about the application for a Title V renewal permit for Columbia Gas Transmission, LLC's Sherwood Compressor Station (R30-01700162-2025). Please send a response to the following questions, along with any revisions to the application's forms or calculations if needed, as soon as practicable but preferably no later than April 3, 2025.

1) The following discrepancies need to be addressed in the emission unit specifications and the emission calculations:

a) Turbines:

i) In the current NSR and Title V permits, the horsepower rating of T01/T02 is limited to 7,417 hp, but, in this application, the rating was increased to 7,684 hp. Similarly, the horsepower rating of T03/T04 is currently limited to 15,427 hp, but the rating was increased to 15,900 hp in the renewal application. What are the reasons for these changes?

ii) In the PTE calculations for the turbines:

1) When compared to the applications for R13-3313 and the initial Title V permit, the emission factors (in terms of lbs/mmBTU) used to calculate the turbines' emissions of NOx, CO, and VOCs have increased. However, the turbines' hourly potential emissions for these pollutants were not revised. Why have the emission factors changed?

2) T01/T02: The annual potential emissions of NOx, CO, and VOCs reported in this renewal application are lower than the potential emissions currently permitted for each turbine.

T03/T04: The annual potential emissions of CO reported in this renewal application are higher than the annual potential emissions currently permitted for each turbine; and the annual potential emissions of NOx reported in this renewal application are lower than the potential emissions currently permitted for each turbine.

The changes to the annual PTE of NOx, CO, and VOCs appear to be due to revisions of the amount of time that the turbines are assumed to spend in each operating mode. Are these updated hours of operation accurate?

3) The annual potential emissions of PM from T01/T02 have decreased by 0.07 tpy, and the annual potential emissions of PM from T03/T04 have increased by 0.11 tpy. What is the reason for this change?

b) Emergency Generator: The potential CO and VOC emissions from the emergency generator G1 were updated with R13-3313C and R30-01700162-2020 (MM02). With these revisions, the emission standards associated with Subpart JJJJ were used to calculate the PTE and to set the emission limits for the generator. However, in this renewal application, it appears that the lower emission factors from the engine manufacturer were used to calculate the generator's potential CO, NOx, and VOC emissions. Please update the emission calculations to reflect the permitted PTE/limits.

c) The potential emissions of VOCs and HAPs from the equipment leaks, compressor venting, and blowdowns were revised in this renewal application. Why did the potential VOC emissions from these emission points increase? Why did the potential HAP emissions decrease?

2) The WV DAQ received notices that the turbines T03 and T04 were to be replaced with like-kind units. Has the replacement of these turbines been completed? If so, what are the construction/installation dates of the replacement turbines?

3) The city and zip code of the facility's physical address in the application is different to the address in the current operating permit. Please confirm the street address, city, and zip code of the facility.

For some of the changes discussed above, a permit determination or NSR/Title V permit revision application may be required. Please let me know if you plan to submit an application for a permit revision or if a permit determination has already been completed.

Thank you,
- Sarah

--
Sarah Barron
Engineer Trainee
West Virginia Department of Environmental Protection
Division of Air Quality
(304) 414-1915
sarah.k.barron@wv.gov

Barron, Sarah K <sarah.k.barron@wv.gov>

Completeness Determination, Sherwood Compressor Station, Application No. R30-01700162-2025

2 messages

Barron, Sarah K <sarah.k.barron@wv.gov> Wed, Nov 13, 2024 at 4:25 PM
To: caleb_raikes@tcenergy.com, David Keatley <david_keatley@tcenergy.com>

Your Title V renewal application for a permit to operate the above referenced facility was received by this Division on October 30, 2024. After review of said application, it has been determined that the application is administratively complete as submitted. Therefore, the above referenced facility qualifies for an Application Shield.

The applicant has the duty to supplement or correct the application. Any applicant who fails to submit any relevant facts or who has submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application but prior to release of a draft permit.

The submittal of a complete application shall not affect the requirement that any source have all **preconstruction permits** required under the rules of the Division.

If during the processing of this application it is determined that additional information is necessary to evaluate or take final action on this application, a request for such information will be made in writing with a reasonable deadline for a response. Until which time as your renewal permit is issued or denied, please continue to operate this facility in accordance with 45CSR30, section 6.3.c. which states: *If the Secretary fails to take final action to deny or approve a timely and complete permit application before the end of the term of the previous permit, the permit shall not expire until the renewal permit has been issued or denied, and any permit shield granted for the permit shall continue in effect during that time.* This protection shall cease to apply if, subsequent to the completeness determination made pursuant to paragraph 6.1.d. of 45CSR30 and as required by paragraph 4.1.b., the applicant fails to submit by the deadline specified in writing any additional information identified as being needed to process the application.

Please remember, **failure of the applicant to timely submit information required or requested to process the application may cause the Application Shield to be revoked.** Should you have any questions regarding this determination, please contact me.

Sincerely,

Sarah Barron

--
Sarah Barron
Engineer Trainee
West Virginia Department of Environmental Protection
Division of Air Quality
(304) 414-1915
sarah.k.barron@wv.gov

David Keatley <david_keatley@tcenergy.com> Thu, Nov 14, 2024 at 9:16 AM
To: "sarah.k.barron@wv.gov" <sarah.k.barron@wv.gov>

Your message

To: David Keatley
Subject: [EXTERNAL] Completeness Determination, Sherwood Compressor Station, Application No. R30-01700162-2025
Sent: Wednesday, November 13, 2024 4:25:56 PM (UTC-05:00) Eastern Time (US & Canada)

was read on Thursday, November 14, 2024 9:15:47 AM (UTC-05:00) Eastern Time (US & Canada).

Received
October 30, 2024
WV DEP/Div of Air Quality

Division of Air Quality Permit Application Submittal

Please find attached a permit application for : Columbia Gas Transmission, LLC; Sherwood Compressor Station
[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 017-00162
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R30-01700162-2020 (MM02 and MM03), R13-3313D

- Type of NSR Application (check all that apply):
  - ☐ Construction
  - ☐ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Revision (if any)**:
  - ☐ Title V Initial
  - ☑ Title V Renewal
  - ☐ Administrative Update
  - ☐ Minor Modification
  - ☐ Significant Modification
  - ☐ Off Permit Change

If any box above is checked, include the Title V revision information as ATTACHMENT S to this application.

- Payment Type:
  - ☐ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
    - Name:
    - Email:
    - Phone Number:
  - ☑ Company Contact
    - Name: David Keatley
    - Email: david_keatley@tcenergy.com
    - Phone Number: (304) 357-2443
  - ☐ Consultant
    - Name:
    - Email:
    - Phone Number:

Columbia Gas Transmission, LLC

Air Permit Application for Title V Renewal
Sherwood Compressor Station

Sherwood, West Virginia

Prepared By:

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

October 2024

Columbia Gas Transmission, LLC
1700 MacCorkle Avenue SE
Charleston, WV 25314

October 24th, 2024

Director
WV Department of Environmental Protection (WVDEP)
Division of Air Quality (DAQ)
601 57th Street SE
Charleston, WV 25314

Re: Columbia Gas Transmission, LLC (Columbia)
Sherwood Compressor Station (WVDAQ Facility ID: 017-00162) Title V Operating Permit Renewal Application

Ms. Crowder,

Columbia operates a Natural Gas Compressor Station in Sherwood, West Virginia. The facility currently maintains an NSR Permit No. R13-3313D under 45CSR13 and a Title V Permit No. R30-01700162-2020 under 45CSR30. The current Title V Permit to Operate expires on May 11, 2025.

This package contains the general application forms along with the required attachments for a Title V renewal permit application. Sherwood Compressor Station's Potential to Emit (PTE) exceeds 100 tons per year for Carbon Monoxide (CO) and Nitrogen Oxide (NO_X). For this reason, Sherwood is considered a Title V source for permitting purposes.

Should you have any questions or require additional information, please contact me by email at david_keatley@tcenergy.com.

Sincerely,

David Keatley
Environmental Analyst
USNG Environmental Compliance
TC Energy

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

1. **Name of Applicant (As registered with the WV Secretary of State's Office):** Columbia Gas Transmission, LLC	**2. Facility Name or Location:** Sherwood Compressor Station
3. DAQ Plant ID No.: 017-00162	**4. Federal Employer ID No. (FEIN):** 31-0802435-30

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence?
☒ Permit Renewal — What is the expiration date of the existing permit? 05/11/2025
☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

☐ Corporation ☐ Governmental Agency ☒ LLC
☐ Partnership ☐ Limited Partnership

7. Is the Applicant the:

☐ Owner ☐ Operator ☒ Both

If the Applicant is not both the owner and operator, please provide the name and address of the other party.

8. Number of onsite employees:

<10

9. Governmental Code:

☒ Privately owned and operated; 0
☐ Federally owned and operated; 1
☐ State government owned and operated; 2
☐ County government owned and operated; 3
☐ Municipality government owned and operated; 4
☐ District government owned and operated; 5

10. Business Confidentiality Claims

Does this application include confidential information (per 45CSR31)? ☐ Yes ☒ No

If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY"* guidance.

11. Mailing Address		
Street or P.O. Box: 1700 MacCorkle Ave, SE		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Fax Number:**	

12. Facility Location (Physical Address)		
Street: 2678 WV Route 18 South	**City:** Sherwood	**County:** Doddridge
UTM Easting: 523.0 km	**UTM Northing:** 4,346.7 km	**Zone:** ☒ 17 or ☐ 18
Directions: From the town of Smithburg, head southwest on Smithbury St. towards Smithton Rd. and make a left. In approximately 0.5 miles, keep left to continue on Co. Rte. 50/22. In approximately 0.2 miles, turn left onto US-50 W, then left onto Snowbird Lane. At the end of Snowbird Lane, turn right onto Rt. 18. The Station will be on the right in approximately 0.5 miles.		
Portable Source? ☐ Yes ☒ No		
Is facility located within a nonattainment area? ☐ Yes ☒ No		**If yes, for what air pollutants?**
Is facility located within 50 miles of another state? ☐ Yes ☒ No		**If yes, name the affected state(s).** Ohio
Is facility located within 100 km of a Class I Area[1]? ☐ Yes ☒ No **If no, do emissions impact a Class I Area[1]?** ☐ Yes ☒ No		**If yes, name the area(s).** Otter Creek Wilderness Area

[1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.*

13. Contact Information		
Responsible Official: Caleb Raikes		**Title:** Manager of Operations
Street or P.O. Box: 2678 WV Route 18 South		
City: Sherwood	**State:** WV	**Zip:** 26436
Telephone Number: (304) 543-3077	**Cell Number:**	
E-mail address: caleb_raikes@tcenergy.com		
Environmental Contact: David J. Keatley PE, PhD		**Title:** Environmental Analyst USNG Environmental Compliance
Street or P.O. Box: 1700 MacCorkle Ave, SE, 5th Floor		
City: Charleston	**State:** WV	**Zip:** 25314
Telephone Number: (304) 357-2443	**Cell Number:**	
E-mail address: david_keatley@tcenergy.com		
Application Preparer: Michael Dearing		**Title:** Project Manager
Company: Environmental Resources Management, Inc.		
Street or P.O. Box:		
City:	**State:**	**Zip:**
Telephone Number:	**Cell Number:**	
E-mail address: michael.dearing@erm.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Transmission		486210	4922

Provide a general description of operations.

Sherwood Compressor Station is a natural gas transmission and compressor facility covered by Standard Industrial Classification (SIC) Code 4922. The station has the potential to operate twenty-four (24) hours per day, seven (7) days per week, fifty-two (52) weeks per year.

The station consists of two (2) 15,900-hp Solar Mars 100 turbine compressor engines, two (2) 7,684-hp Solar Taurus 60 turbine compressor engines, one (1) 1,175-hp Waukesha VGF-P48GL emergency generator RICE, one (1) 0.80-MMBtu/hr process heater, one (1) 1.5-MMBtu/hr process heater, catalytic heaters with a total heat output of 2.88-MMBtu/hr, one (1) 1,000-gal wastewater storage tank, and one (1) 2,056-gal pipeline liquids storage tank.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR34)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS	☒ Section 112(d) MACT standards
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64)
☐ Cross-State Air Pollution Rule (45CSR43)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR 60 Subpart Dc – The proposed heaters are less than the 10 MMBtu/hr applicability threshold in §40 CFR 60.40c(a).

40 CFR 60 Subpart OOOO – The proposed units are not affected facilities listed under 40 CFR §60.5365.

☐ Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

- R13-3313D Condition 3.1.4: Do not discharge air pollutants which cause or contribute to an objectionable odor. [45CSR§4-3.1]
- R13-3313D Condition 3.3: Conduct stack tests as required and submit a report of the results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4: Facility-wide recordkeeping requirements.
- R13-3313D Condition 3.5: Facility-wide reporting requirements.

☐ Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

- R13-3313D Condition 3.3.1: Submit a protocol 30 days prior to testing and submit a report of all stack test results within 60 days after test completion. [45CSR13]
- R13-3313D Condition 3.4.1: Maintain records of all information required by the permit for at least five years.
- R13-3313D Condition 3.4.2: Maintain records of all odor complaints received, any investigation performed in response to such a complaint, and any responsive actions take [45CSR4]
- R13-3313D Condition 3.5.4: Submit a certified emissions statement and pay fees on an annual basis. [45CSR30]

Are you in compliance with all facility-wide applicable requirements? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

21. Active Permits/Consent Orders		
Permit or Consent Order Number	Date of Issuance MM/DD/YYYY	List any Permit Determinations that Affect the Permit *(if any)*
R13-3313	11/14/2016	
R13-3313A	12/18/2017	
R30-01700162-2020 (MM01)	05/11/2020	
R13-3313B	06/09/2022	
R13-3313C	06/19/2023	
R13-3313D	07/02/2024	
R30-01700162-2020 (MM02 and MM03)	09/03/2024	

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	237.92
Nitrogen Oxides (NO_X)	100.18
Lead (Pb)	-
Particulate Matter ($PM_{2.5}$)[1]	11.82
Particulate Matter (PM_{10})[1]	11.82
Total Particulate Matter (TSP)	11.82
Sulfur Dioxide (SO_2)	1.27
Volatile Organic Compounds (VOC)	30.04
Hazardous Air Pollutants[2]	Potential Emissions
Total HAPs	2.00
Formaldehyde	1.37
Regulated Pollutants other than Criteria and HAP	Potential Emissions
CO_2e	229,091.63

[1] $PM_{2.5}$ and PM_{10} are components of TSP.

[2] For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)		
☒	1.	Air compressors and pneumatically operated equipment, including hand tools.
☒	2.	Air contaminant detectors or recorders, combustion controllers or shutoffs.
☒	3.	Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
☒	4.	Bathroom/toilet vent emissions.
☒	5.	Batteries and battery charging stations, except at battery manufacturing plants.
☐	6.	Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
☐	7.	Blacksmith forges.
☐	8.	Boiler water treatment operations, not including cooling towers.
☐	9.	Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
☐	10.	CO_2 lasers, used only on metals and other materials which do not emit HAP in the process.
☒	11.	Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
☒	12.	Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
☒	13.	Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
☐	14.	Demineralized water tanks and demineralizer vents.
☐	15.	Drop hammers or hydraulic presses for forging or metalworking.
☐	16.	Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
☐	17.	Emergency (backup) electrical generators at residential locations.
☐	18.	Emergency road flares.
☐	19.	Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO_2, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis:

24. Insignificant Activities (Check all that apply)

☐ 20. Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27.

Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis:

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	lb/year
Pipeline Liquids Tank A01	0.07	0.29	<0.01	<0.01
Wastewater Tank A03	<0.01	<0.01	<0.01	<0.01
Totals	0.07	0.29	<0.01	<0.01

☐ 21. Environmental chambers not using hazardous air pollutant (HAP) gases.

☐ 22. Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.

☐ 23. Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.

☒ 24. Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.

☐ 25. Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.

☐ 26. Fire suppression systems.

☐ 27. Firefighting equipment and the equipment used to train firefighters.

☐ 28. Flares used solely to indicate danger to the public.

☐ 29. Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.

☐ 30. Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.

☐ 31. Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.

☐ 32. Humidity chambers.

☐ 33. Hydraulic and hydrostatic testing equipment.

☐ 34. Indoor or outdoor kerosene heaters.

☐ 35. Internal combustion engines used for landscaping purposes.

☐ 36. Laser trimmers using dust collection to prevent fugitive emissions.

☐ 37. Laundry activities, except for dry-cleaning and steam boilers.

☒ 38. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.

☐ 39. Oxygen scavenging (de-aeration) of water.

☐ 40. Ozone generators.

24. Insignificant Activities (Check all that apply)		
☐	41.	Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
☐	42.	Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
☐	43.	Process water filtration systems and demineralizers.
☐	44.	Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
☐	45.	Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
☐	46.	Routing calibration and maintenance of laboratory equipment or other analytical instruments.
☐	47.	Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
☐	48.	Shock chambers.
☐	49.	Solar simulators.
☐	50.	Space heaters operating by direct heat transfer.
☐	51.	Steam cleaning operations.
☐	52.	Steam leaks.
☐	53.	Steam sterilizers.
☐	54.	Steam vents and safety relief valves.
☐	55.	Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
☐	56.	Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
☒	57.	Such other sources or activities as the Director may determine.
☒	58.	Tobacco smoking rooms and areas.
☒	59.	Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**.
26. Emission Units
For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**.
For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**.
27. Control Devices
For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**.
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**.

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

Note: This Certification must be signed by a responsible official as defined in 45CSR§30-2.38.

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

Responsible official (type or print)

Name: Caleb Raikes	Title: Manager of Operations

Responsible official's signature:

Signature: Caleb Raikes Signature Date: 10/30/2024

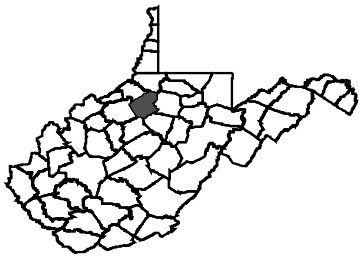
(Must be signed and dated in blue ink or have a valid electronic signature)

Note: Please check all applicable attachments included with this permit application:

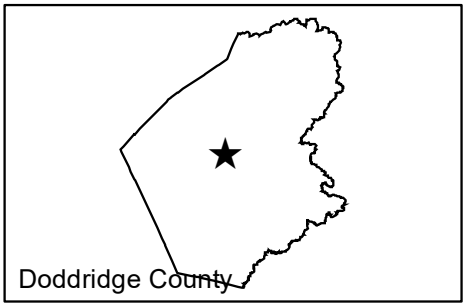
☒	ATTACHMENT A: Area Map
☒	ATTACHMENT B: Plot Plan(s)
☒	ATTACHMENT C: Process Flow Diagram(s)
☒	ATTACHMENT D: Equipment Table
☒	ATTACHMENT E: Emission Unit Form(s)
☐	ATTACHMENT F: Schedule of Compliance Form(s)
☐	ATTACHMENT G: Air Pollution Control Device Form(s)
☐	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s)

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

Attachment A
Area Map



West Virginia



0 1,000 2,000 4,000 Feet

N

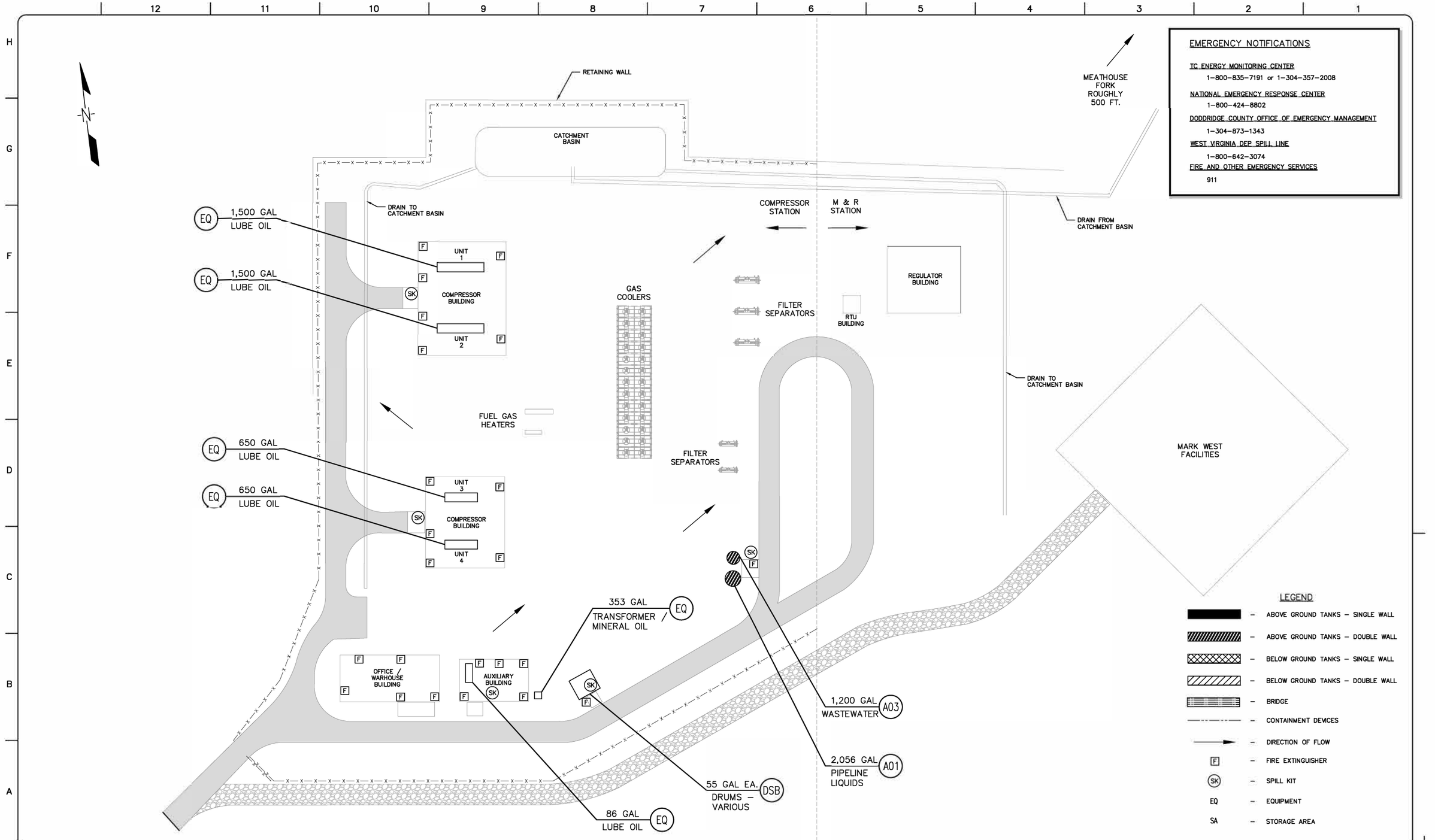
LAT. 39.269673 LON. -80.732527
DODDRIDGE COUNTY
WEST VIRGINIA

USGS 1:24K 7.5' Quadrangle:
Smithburg, WV

ERM	Sherwood Compressor Station 2678 WV Route 18 South Sherwood, West Virginia 26436	GIS Review: GM CHK'D: GM 0716980
Drawn By: SRV-05/05/2022	**Environmental Resources Management**	ATTACHMENT A

\\stddcfs02\data\Philadelphia\Team\DMMV\GIS\Projects\SiteLocationMaps\TC Energy_MXD\AttachmentB-SiteLocusMap_SherwoodCompressorStation_20220505.mxd - 5/5/2022|SRV

Attachment B
Plot Plan



EMERGENCY NOTIFICATIONS

TC ENERGY MONITORING CENTER
1–800–835–7191 or 1–304–357–2008

NATIONAL EMERGENCY RESPONSE CENTER
1–800–424–8802

DODDRIDGE COUNTY OFFICE OF EMERGENCY MANAGEMENT
1–304–873–1343

WEST VIRGINIA DEP SPILL LINE
1–800–642–3074

FIRE AND OTHER EMERGENCY SERVICES
911

LEGEND

- ABOVE GROUND TANKS – SINGLE WALL
- ABOVE GROUND TANKS – DOUBLE WALL
- BELOW GROUND TANKS – SINGLE WALL
- BELOW GROUND TANKS – DOUBLE WALL
- BRIDGE
- CONTAINMENT DEVICES
- DIRECTION OF FLOW
- F – FIRE EXTINGUISHER
- SK – SPILL KIT
- EQ – EQUIPMENT
- SA – STORAGE AREA

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
1	11/08/2023	CHANGED TITLE AND REPLACED A02 TANK DESIGNATION WITH A03. VOLUME CHANGED FROM 1500 TO 1200 GALLONS

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
	LAG					

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

SHERWOOD COMPRESSOR STATION

FIA # | CHAINAGE: | DISCIPLINE #

PLOT PLAN – SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC)

SCALE | DRAWING No FD–C202–SPCC | REV 1

TIME: DESIGNFILE:

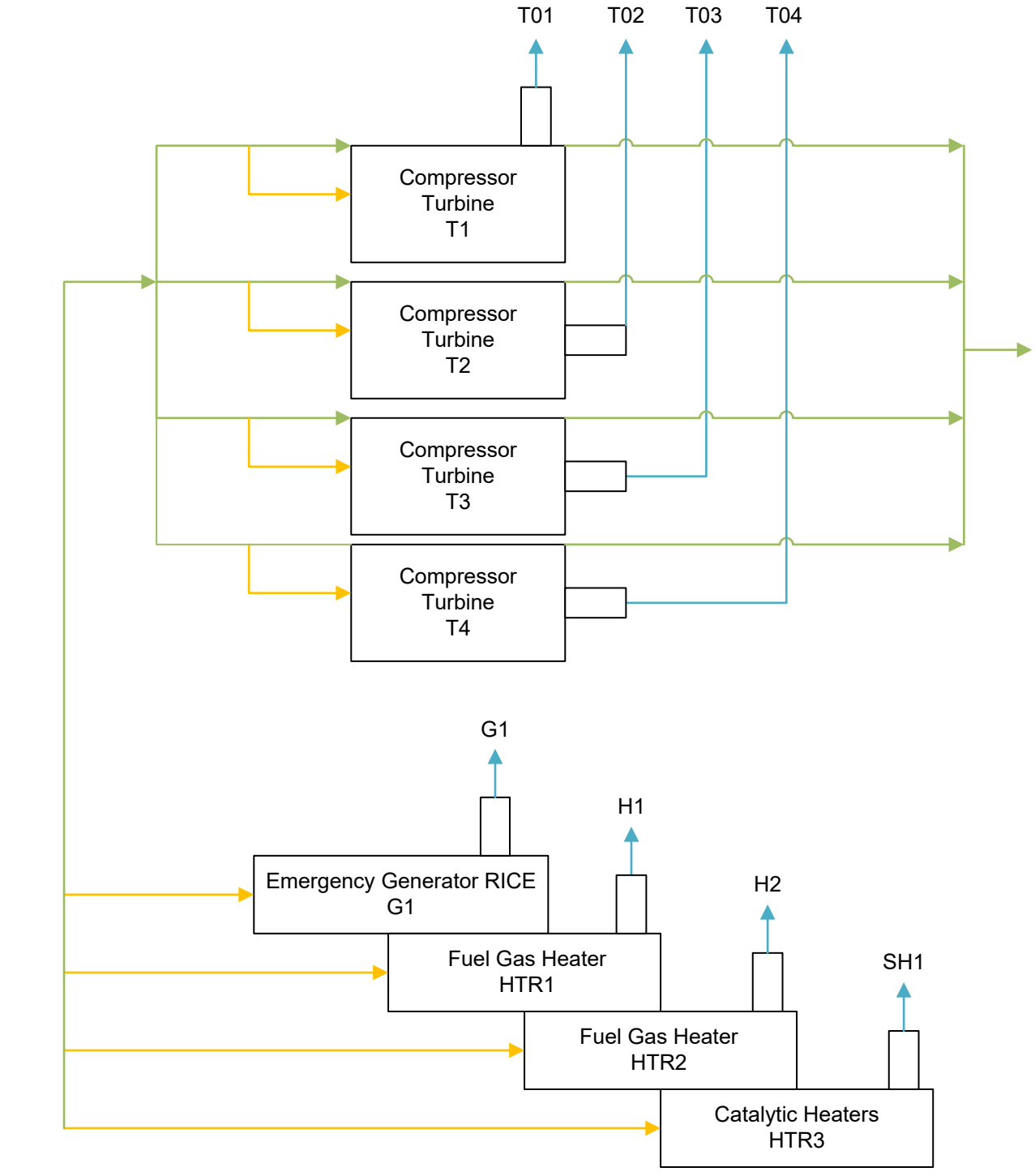
TC_JJD_BR_24x36.DWG 24X36

CADD DRAWING; DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ARCH D (24x36)

Attachment C
Process Flow Diagram

ATTACHMENT C
SHERWOOD COMPRESSOR STATION
PROCESS FLOW DIAGRAM



TC Energy

Attachment D
Equipment Table

Attachment D - Title V Equipment Table

(includes all emission units at the facility except those designated insignificant activities in Section 4, Item 24 of the General Forms

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
T1	T01	Compressor Turbine; Solar Taurus 60	2019	7,684 hp @ 32 °F	Existing	None
T2	T02	Compressor Turbine; Solar Taurus 60	2019	7,684 hp @ 32 °F	Existing	None
T3	T03	Compressor Turbine; Solar Mars 100	2019	15,900 hp @ 32 °F	Existing	None
T4	T04	Compressor Turbine; Solar Mars 100	2019	15,900 hp @ 32 °F	Existing	None
G1	G01	Waukesha VGF-P48GL Emergency Generator RICE	2019	1,175 hp	Existing	None
HTR1	H1	Fuel Gas Heater	2019	1.5 MMBtu/hr	Existing	None
HTR2	H2	Fuel Gas Heater	2019	0.8 MMBtu/hr	Existing	None
HTR3	SH1	Catalytic Heaters	2019	2.88 MMBtu/hr (total)	Existing	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment E
Emission Unit Forms

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T1, T2	Taurus 60 Turbine #1 Taurus 60 Turbine #2	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Taurus 60, Compressor Turbine #1

Natural gas-fired Solar Taurus 60, Compressor Turbine #2

Manufacturer: Solar	**Model number:** Taurus 60	**Serial number:**
Construction date: 02/25/2019 (in service)	**Installation date:** 02/25/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

7,684 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
66,904.7 scf/hr (based on 32°F)	586.09 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 68.24 MMBtu/hr (HHV, 32°F) 7,684 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 66,904.7 scf/hr; 586.09 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.74	37.35
Nitrogen Oxides (NO_X)	3.68	16.45
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.43	1.90
Particulate Matter (PM_{10})	0.43	1.90
Total Particulate Matter (TSP)	0.43	1.90
Sulfur Dioxide (SO_2)	3.90	0.21
Volatile Organic Compounds (VOC)	0.43	2.09
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.07	0.31
Formaldehyde	0.04	0.21
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	7,029.95	30,791.17

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 and 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

(6) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T3, T4	Mars 100 Turbine #3 Mars 100 Turbine #4	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Solar Mars 100, Compressor Turbine #3

Natural gas-fired Solar Mars 100, Compressor Turbine #4

Manufacturer: Solar	**Model number:** Mars 100	**Serial number:**
Construction date: 02/12/2019 (in service)	**Installation date:** 02/12/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

15,900 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
129,427.7 scf/hr (based on 32°F)	1,133.85 MMscf/yr (based on 32°F)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 130.02 MMBtu/hr (HHV, 32°F) 15,900 HP @ 32°F	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 129,427.7 scf/hr; 1,133.85 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	7.23	80.26
Nitrogen Oxides (NO_X)	7.12	31.89
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.90	3.93
Particulate Matter (PM_{10})	0.90	3.93
Total Particulate Matter (TSP)	0.90	3.93
Sulfur Dioxide (SO_2)	7.54	0.41
Volatile Organic Compounds (VOC)	0.83	4.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.13	0.59
Formaldehyde	0.09	0.41
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	14,313.88	62,694.79

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, CO, and $PM_{2.5}$ / PM_{10} / TSP: Vendor Data (20% of UHC for VOC)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.1-3 (4/00)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) 40 CFR 60 Subpart KKKK §60.4305(a) - Subject to this subpart since the turbine has a heat input ≥ 10 MMBtu/hr.

(2) R13-3313D Condition 5.1.2: Annual emission limits (tpy): NO_X - 16.78, CO - 38.95, VOC - 2.13, SO_2 -0.21, PM_{10} - 1.97, CH_2O - 0.21

(3) R13-3313D Condition 5.1.3 and 5.1.4: Comply with the maximum hourly emission limits for each operating parameter.

(4) R13-3313D Condition 5.1.5: NO_X limited to 25 ppm at 15% O_2 or 150 ng/J of useful output (1.2 lb/MWh). When operating at less than 75% peak load or at temperatures less than 0°F, the limit for NO_X is 150 ppm at 15% O_2 or 1,100 ng/J of useful output (8.7 lb/MWh). [40 CFR §60.4320]

(5) R13-3313D Condition 5.1.6: SO_2 limited to 0.060 lb of SO_2/MMBtu heat input. [40 CFR §60.4330(a)(2)]

(6) R13-3313D Condition 5.1.7: Operate and maintain the stationary combustion turbines in a manner consistent with good air pollution control practices during startup, shutdown, and malfunction. [40 CFR §60.4333(a) and 60.4365(a)]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313d Condition 5.4.1: Submit an initial notification within 15 days after start-up. [40 CFR §60.7(a)(3)]

(2), (3) R13-3313D Condition 5.3.3: Maintain records of the monthly operating hours for normal, low-load, low-temperature, and startup/shutdown operation. Calculate monthly emissions and keep in rolling 12-month format.

R13-3313D Condition 5.2.2: Conduct an initial performance test for CO within 180 days of startup. Conduct subsequent testing every 5 years. Submit copy of performance test within 60 days of test completion.

(4) R13-3313D Conditions 5.2.1 & 5.4.2: Conduct an initial performance test for NO_X within 60 days after achieving maximum output of the turbine, but no later than 180 days after initial startup. Conduct subsequent performance tests annually. This frequency can be reduced to every two years if the results demonstrate the turbine achieved compliance of <= 75% of the NO_X emission limit. Maintain records of performance tests. Submit copy of performance test within 60 days of test completion. [40 CFR §60.8, §60.4340(a), §60.4375(b), §60.4400]

(5) R13-3313D Condition 5.3.2: Maintain the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 scf. [40 CFR §60.4365(a)]

(6) R13-3313D Condition 5.3.1: Maintain records of the amount of natural gas consumed.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
G1	Emergency Generator RICE	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired 4SLB Waukesha VGF-P48GL Emergency Generator RICE

Manufacturer: Waukesha	**Model number:** VGF-P48GL	**Serial number:**
Construction date: 04/10/2019 (in service)	**Installation date:** 04/10/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,175 HP

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
8,908 scf/hr	4.45 MMscf/yr	500 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 9.09 MMBtu/hr 1,175 HP	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 8,908 scf/hr; 4.45 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.36	0.84
Nitrogen Oxides (NO_X)	5.17	1.29
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	<0.01
Particulate Matter (PM_{10})	<0.01	<0.01
Total Particulate Matter (TSP)	<0.01	<0.01
Sulfur Dioxide (SO_2)	0.52	<0.01
Volatile Organic Compounds (VOC)	0.13	0.03
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.66	0.16
Formaldehyde	0.48	0.12
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	1,063.98	265.99

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X, VOC, and CO: Vendor Data (20% of UHC for VOC)

$PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 3.2-2 (10/24) – 4SLB

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 3.2-2 (10/24) – 4SLB

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) Comply with 40 CFR 62 Subpart ZZZZ.

(2) R13-3313D Condition 6.1.1: Operating hours limited to 500 hours/year.

(3) R13-3313D Condition 6.1.2: Maximum emissions shall not exceed the following limits (tpy): NO_X - 1.30, CO - 2.59, VOC - 0.80.

(4) R13-3313D Condition 6.2.1: NO_X emissions shall not exceed 2.0 g/hp-hr or 160 ppm_{vd} at 15% O_2. CO emissions shall not exceed 1.0 g/hp-hr or 86 ppm_{vd} at 15% O_2 (excluding CH_2O emissions). [40 CFR §60.4233(e), Table I]

(5) 40 CFR 60 Subpart JJJJ work practice standards.

(6) 40 CFR 60 Subpart JJJJ notification requirements.

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) 40 CFR 63 Subpart ZZZZ; §63.6590(c)(1): Comply with NESHAP Subpart ZZZZ by complying with NSPS Subpart JJJJ.

(2) R13-3313D Condition 6.6.1: Maintain records of hours of operation including how many hours are spent for emergency operation, and reason for non-emergency operation. [40 CFR §50.4245(6)]

(2) R13-3313D Condition 6.3.1: Install a non-resettable hour meter. [40 CFR §60.4237(a)]

(3) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(4) R13-3313D Conditions 6.4.1 & 6.6.1: Conduct an initial performance test and subsequent performance test every 8,760 hours of operation or 3 years, whichever comes first. Submit a copy of the performance test within 60 days after test completion. [40 CFR §60.4243(b), §60.4245(d)]

(5) R13-3313D Condition 6.4.1: Keep a maintenance plan and records of conducted maintenance as well as all notifications submitted. [40 CFR §60.4245(a)]

(6) R13-3313D Condition 6.6.1: Submit an initial notification within 30 days after construction. [40 CFR §60.4245(c)]

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR1	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1.5 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
1470.6 scf/hr	12.88 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 1.5 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 1470.6 scf/hr; 12.88 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.12	0.54
Nitrogen Oxides (NO_X)	0.15	0.64
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.01	0.05
Particulate Matter (PM_{10})	0.01	0.05
Total Particulate Matter (TSP)	0.01	0.05
Sulfur Dioxide (SO_2)	0.09	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.04
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	175.65	769.33

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR2	GT Fuel Gas Heater	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Indirect Fuel Gas Heater

Manufacturer: GasTech	**Model number:**	**Serial number:**
Construction date: 01/30/2019 (in service)	**Installation date:** 01/30/2019 (in service)	**Modification date(s):** N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

0.8 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☒ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 0.8 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.07	0.29
Nitrogen Oxides (NO_X)	0.08	0.34
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	<0.01	0.02
Particulate Matter (PM_{10})	<0.01	0.02
Total Particulate Matter (TSP)	<0.01	0.02
Sulfur Dioxide (SO_2)	0.05	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.02
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	93.68	410.31

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

(1) R13-3313D Condition 7.1.2: Smoke and/or particulate matter emitted into the open air must not be greater than 10% opacity based on a six-minute block average. [45 CSR §2-3.1]

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

(1) R13-3313D Condition 7.2.1: When requested, conduct Method 9 emission observations. [45 CSR §2-3.2]

R13-3313D Condition 7.3.1: When requested, compliance shall be determined in accordance with Method 9 emissions observations or b y using measurements from continuous opacity monitoring systems approved by the Secretary.
R13-3313D Condition 7.4.1: Maintain records of each visible emission check, the general weather conditions, the emission point or equipment ID number, the name or means of ID of the observer, the results of the check, whether the visible emissions are normal for the process, and all corrective measures taken or planned.

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
HTR3	Catalytic Heaters	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

Natural gas-fired Flameless Catalytic Heaters

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/30/2019 (in service)	01/30/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2.88 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
784.3 scf/hr	6.87 MMscf/yr	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☒ Yes ☐ No	**If yes, is it?** ☐ Indirect Fired ☒ Direct Fired
Maximum design heat input and/or maximum horsepower rating: 2.88 MMBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas: 784.3 scf/hr; 6.87 MMscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0.25 grains S/100 scf	0	1,020 Btu/scf

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.24	1.04
Nitrogen Oxides (NO_X)	0.28	1.24
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.02	0.07
Particulate Matter (PM_{10})	0.02	0.07
Total Particulate Matter (TSP)	0.02	0.07
Sulfur Dioxide (SO_2)	0.16	<0.01
Volatile Organic Compounds (VOC)	0.02	0.07
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	0.02
Formaldehyde	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	337.24	1477.11

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NO_X and CO: AP-42 Table 1.4-1 (7/98)

VOC and $PM_{2.5}$ / PM_{10} / TSP: AP-42 Table 1.4-2 (7/98)

SO_2: 20 grains S/100 scf (hourly); 0.25 grams S/100 scf (annually)

HAPs: AP-42 Table 1.4-3 & 4 (7/98)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A01	Pipeline Liquids Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

2,056 gallon pipeline liquids storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

2,056 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	52,122 gal (12 times throughput of first 30 days of production)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	0.07	0.29
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	38.48	168.54

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
A03	Wastewater Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.; for engines, please indicate compression or spark ignition, lean or rich, four or two stroke, non-emergency or emergency, certified or not certified, as applicable)

1,000 gallon wastewater storage tank

Manufacturer:	**Model number:**	**Serial number:**

Construction date:	**Installation date:**	**Modification date(s):**
01/25/2019 (in service)	01/25/2019 (in service)	N/A

Design Capacity (examples: furnaces - tons/hr, tanks – gallons, boilers – MMBtu/hr, engines - hp):

1,000 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	12,000 gal (12 turnovers)	8,760 hr/yr

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ☐ Yes ☒ No	**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	-	-
Nitrogen Oxides (NO_X)	-	-
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	-	-
Particulate Matter (PM_{10})	-	-
Total Particulate Matter (TSP)	-	-
Sulfur Dioxide (SO_2)	-	-
Volatile Organic Compounds (VOC)	<0.01	<0.01
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	<0.01	<0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	<0.01	0.01

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

VOC and HAPs: AP-42 Chapter 7.1 equations

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

N/A

☐ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

N/A

Are you in compliance with all applicable requirements for this emission unit? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

Appendix A
Calculations

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Facility Total PTE

Source	Annual Emissions															
	VOC		Total HAP		NO_x		CO		$PM / PM_{2.5} / PM_{10}$		SO_2		CH_4		CO_2e	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.43	2.09	0.07	0.31	3.68	16.45	3.74	37.35	0.43	1.90	3.90	0.21	0.13	0.58	7,029.95	30,791.17
T02 - Solar Taurus 60 Turbine	0.43	2.09	0.07	0.31	3.68	16.45	3.74	37.35	0.43	1.90	3.90	0.21	0.13	0.58	7,029.95	30,791.17
T03 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	31.89	7.23	80.26	0.90	3.93	7.54	0.41	0.27	1.18	14,313.88	62,694.79
T04 - Solar Mars 100 Turbine	0.83	4.16	0.13	0.59	7.12	31.89	7.23	80.26	0.90	3.93	7.54	0.41	0.27	1.18	14,313.88	62,694.79
G01 - Waukesha Emergency Generator RICE	0.13	0.03	0.66	0.16	5.17	1.29	3.36	0.84	<0.01	<0.01	0.52	<0.01	0.02	<0.01	1,063.98	265.99
H1 - Process Heater	<0.01	0.04	<0.01	0.01	0.15	0.64	0.12	0.54	0.01	0.05	0.09	<0.01	<0.01	0.01	175.65	769.33
H2 - Process Heater	<0.01	0.02	<0.01	<0.01	0.08	0.34	0.07	0.29	<0.01	0.05	0.05	<0.01	<0.01	<0.01	93.68	410.31
SH1 - Catalytic Heaters	0.02	0.07	<0.01	0.02	0.28	1.24	0.24	1.04	0.02	0.07	0.16	<0.01	<0.01	0.03	337.24	1,477.11
A01 - Pipeline Liquids Tanks	0.07	0.29	<0.01	<0.01									1.37	6.00	38.48	168.54
A03 - Wastewater Tank	<0.01	<0.01	<0.01	<0.01									<0.01	<0.01	<0.01	0.01
Equipment Leaks (fugitive emissions)	0.39	1.72	<0.01	<0.01									32.03	140.29	897.04	3,929.04
Compressor Venting	1.77	7.77	<0.01	<0.01									144.60	633.35	4,049.69	17,737.64
Blowdowns	2.13	9.32	<0.01	<0.01									173.57	760.23	4,860.91	21,290.79
Proposed PTE[1]	6.64	30.04	1.07	2.00	27.28	100.18	25.72	237.92	2.69	11.82	23.69	1.27	320.37	1403.15	53,307.27	229,091.63

1. The facility PTE excludes fugitive emissions since transmission storage compressor stations are not one of the named source categories that include fugitive emissions under 45CSR30.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Facility Total HAPs Emissions

Source	Annual HAPs Emissions																							
	Total HAPs		Methanol		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene		2,2,4-Trimethylpentane		Acetaldehyde		Acrolein		1,3-Butadiene	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
T01 - Solar Taurus 60 Turbine	0.07	0.31			0.04	0.21			<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T02 - Solar Taurus 60 Turbine	0.07	0.31			0.04	0.21			<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
T03 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.07	<0.01	0.02	<0.01	0.03			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
T04 - Solar Mars 100 Turbine	0.13	0.59			0.09	0.41			<0.01	<0.01	0.02	0.07	<0.01	0.02	<0.01	0.03			<0.01	0.02	<0.01	<0.01	<0.01	<0.01
G01 - Waukesha Emergency Generator RICE	0.66	0.16	0.02	<0.01	0.48	0.12	0.01	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.02	0.05	0.01	<0.01	<0.01
H1 - Process Heater	<0.01	0.01			<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01												
H2 - Process Heater	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
H3 - Catalytic Heaters	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01												
A01 - Pipeline Liquids Tanks	<0.01	<0.01					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01								
A03 - Wastewater Tank	<0.01	<0.01					<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01						
Equipment Leaks (fugitive emissions)	<0.01	<0.01																						
Compressor Venting	<0.01	<0.01																						
Blowdowns	<0.01	<0.01																						
Proposed PTE[1]	1.07	2.00	0.02	<0.01	0.74	1.37	0.01	0.02	<0.01	0.02	0.05	0.21	0.01	0.05	0.03	0.10	<0.01	<0.01	0.09	0.08	0.05	0.02	<0.01	<0.01

1. The facility PTE excludes fugitive emissions since transmission storage compressor stations are not one of the named source categories that include fugitive emissions under 45CS

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Insignificant Sources Emissions

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	ton/year
Pipeline Liquids Tanks A01	0.07	0.29	<0.01	<0.01
Wastewater Tank A03	<0.01	<0.01	<0.01	<0.01
Totals	**0.07**	**0.29**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Solar Taurus 60 Turbine (T01 - T02)

Horsepower	7,684	hp	
Brake Specific Fuel Consumption	7,813	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	61.48	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	68.24	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	586.09	MMscf/yr	
	66,905	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x	5.16E-04	0.066	HHV	3.68	16.45	Vendor Data
CO	5.23E-04	0.067	HHV	3.74	37.35	Vendor Data
PM_{10}	5.64E-05	0.0066		0.43	1.90	Vendor Data
$PM_{2.5}$	5.64E-05	0.0066		0.43	1.90	Vendor Data
VOC	6.25E-05	0.008	HHV	0.43	2.09	Vendor Data
SO_2 (Maximum Hourly)	4.46E-04	0.0571	HHV	3.90		20 grains S / 100 scf
SO_2 (Average Annual)	5.58E-06	0.000714	HHV		0.21	0.25 grains S / 100 scf
CO_2	0.91	116.98		7,022.73	30,759.57	40 CFR Subpart C
CH_4	1.72E-05	2.20E-03		0.13	0.58	40 CFR Subpart C
N_2O	1.72E-06	2.20E-04		0.01	0.06	40 CFR Subpart C
Benzene	9.38E-08	1.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.02E-06	1.30E-04	HHV	<0.01	0.03	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.50E-07	3.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.13E-07	4.00E-05	HHV	<0.01	0.01	AP-42 Table 3.1-3 (4/00)
Acrolein	5.00E-08	6.40E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.55E-06	7.10E-04	HHV	0.04	0.21	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.36E-09	4.30E-07	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	1.02E-08	1.30E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.72E-08	2.20E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.27E-07	2.90E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Xylenes	5.00E-07	6.40E-05		<0.01	0.02	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	7,029.95	30,791.17	40 CFR 98 Subpart C
Total HAPs			0.00102	0.07	0.31	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating).
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.1 Table 3.1-3 references are from the April 2000 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Solar Taurus 60 (T01 - T02) - Emissions from Venting

Number of Pneumatic Actuators:	15	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	55,489	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	90.00	80.44	0.17	3.41	0.02	14.91	0.09	417.69	0.18	0.00
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.24	0.00
Intermittent During Startup/Shutdown	**scf/event**	**scf/event**	**scf/event**	**lb/event**	**lb/event**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Starter (Total for number of units)[1]	0	0	0	0	0	0	0	0	0.00	0.00
Blowdowns (Total for number of units)[1,5]	110,978.00	99,194.32	211.74	4,198.77	24.55	209.94	1.23	5,879.50	2.57	0.00
							Total:	6,854.10	3.00	0.00

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (Updated April 2024 and effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 0.012 ratio of VOC to methane as calculated from gas composition.
7. Based on a 1.37E-10 ratio of HAPs to methane as calculated from gas composition.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Solar Taurus 60 (T01 - T02) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	3.68	3.74	0.43
Low Temp (<0 °F)[2]	lb/hr	10.75	15.58	0.89
Low-Load (<50%)[3]	lb/hr	8.50	344.95	3.94
Startup / Shutdown[4]	lb/event	1.10	97.30	1.12

Notes:
1. Based on data from Solar Taurus 60 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8580	15.80	16.03	1.83
Low Temp (<0 °F)		48	0.26	0.37	0.02
Low-Load (<50%)		65	0.28	11.21	0.13
Startup/ Shutdown	200	67	0.11	9.73	0.11
Total		8,760	16.45	37.35	2.09

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T01, T02 / Solar Taurus 60	0.23	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Solar Mars 100 Turbine (T03 - T04)

Horsepower	15,900	HP	
Brake Specific Fuel Consumption	7,688	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	118.94	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	132.02	MMBtu/hr	(HHV, 32 °F)
Operating Hours	8,760	hr/yr	
Natural Gas Heat Content	1,020	Btu/scf	
Fuel Consumption	1133.85	MMscf/yr	
	129,435	scf/hr (based on maximum horsepower)	
Quantity	2		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x	5.07E-04	0.066	HHV	7.12	31.89	Vendor Data
CO	5.15E-04	0.067	HHV	7.23	80.26	Vendor Data
PM_{10}	5.64E-05	0.0066		0.90	3.93	Vendor Data
$PM_{2.5}$	5.64E-05	0.0066		0.90	3.93	Vendor Data
VOC	6.15E-05	0.008	HHV	0.83	4.16	Vendor Data
SO_2 (Maximum Hourly)	4.39E-04	0.0571	HHV	7.54		20 grains S / 100 scf
SO_2 (Average Annual)	5.49E-06	0.000714	HHV		0.41	0.25 grains S / 100 scf
CO_2	0.90	116.98		14,299.19	62,630.46	40 CFR Subpart C
CH_4	1.69E-05	2.20E-03		0.27	1.18	40 CFR Subpart C
N_2O	1.69E-06	2.20E-04		0.03	0.12	40 CFR Subpart C
Benzene	9.23E-08	1.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	9.99E-07	1.30E-04	HHV	0.02	0.07	AP-42 Table 3.1-3 (4/00)
Ethylbenzene	2.46E-07	3.20E-05	HHV	<0.01	0.02	AP-42 Table 3.1-3 (4/00)
Acetaldehyde	3.08E-07	4.00E-05	HHV	<0.01	0.02	AP-42 Table 3.1-3 (4/00)
Acrolein	4.92E-08	6.40E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Formaldehyde	5.46E-06	7.10E-04	HHV	0.09	0.41	AP-42 Table 3.1-3 (4/00)
1,3-Butadiene	3.31E-09	4.30E-07	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Naphthalene	9.99E-09	1.30E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
PAH	1.69E-08	2.20E-06	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Propylene Oxide	2.23E-07	2.90E-05	HHV	<0.01	0.02	AP-42 Table 3.1-3 (4/00)
Xylenes	4.92E-07	6.40E-05		<0.01	0.03	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	14,313.88	62,694.79	40 CFR 98 Subpart C
Total HAPs			0.00102	0.13	0.59	AP-42 Table 3.1-3 (4/00)

Notes:
- Maximum hourly emission rate based on maximum horsepower under optimum conditions (15% greater than site rating).
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2-1 references are from the August 2000 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- Assumed HHV = 1.11*LHV
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Solar Mars 100 (T03 - T04) - Emissions from Venting

Number of Pneumatic Actuators:	7	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	100	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	95,620	scf
Number of Turbines	2	
Number of Dry Seals:	2	per turbine
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8760	

Component	Emission Rate									
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]	HAPs[7]
Continuous During Operation	**scf/hr**	**scf/hr**	**scf/hr**	**lb/hr**	**lb/hr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Actuator (Total for number of units)	42.00	37.54	0.08	1.59	0.01	6.96	0.04	194.92	0.09	0.00
Dry Seals (Total for number of units)	120.00	107.26	0.23	4.54	0.03	19.89	0.12	556.92	0.24	0.00
Intermittent During Startup/Shutdown	**scf/event**	**scf/event**	**scf/event**	**lb/event**	**lb/event**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**	**ton/yr**
Pneumatic Starter (Total for number of units)[1]	0	0	0	0	0	0	0	0	0.00	0.00
Blowdowns (Total for number of units)[1,5]	191,240.00	170,934.08	364.87	7,235.42	42.31	361.77	2.12	10,131.70	4.44	0.00
							Total:	10,883.54	4.77	0.00

Notes:
1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials (Updated April 2024 and effective January 2025).
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 0.012 ratio of VOC to methane as calculated from gas composition.
7. Based on a 1.37E-10 ratio of HAPs to methane as calculated from gas composition.

Columbia Gas Transmission, LLC Sherwood
Compressor Station
Title V Permit Application - October 2024
Solar Mars 100 (T03 - T04) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	7.12	7.23	0.83
Low Temp (<0 °F)[2]	lb/hr	21.12	30.60	1.75
Low-Load (<50%)[3]	lb/hr	16.10	653.41	7.47
Startup/ Shutdown[4]	lb/event	3.10	272.70	3.12

Notes:
1. Based on data from Solar Mars 100 Compressor Set data sheet and the following concentrations:
   15 ppm NOx; 25 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. For the purpose of calculating potential annual emissions, non-startup/shutdown operation
   at <50% load is based on emissions data provided by Solar for 40% load.
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8580	30.55	31.02	3.56
Low Temp (<0 °F)		48	0.51	0.73	0.04
Low-Load (<50%)		65	0.52	21.24	0.24
Startup/ Shutdown	200	67	0.31	27.27	0.31
Total		8,760	31.89	80.26	4.16

Emission Rates During Normal Operation (g/hp-hr)[1]

Emission Point ID / Model	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
T03, T04 / Solar Mars 100	0.21	0.21	0.02	0.22	*0.03*	*0.003*

Notes:
1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Waukesha VGF-P48GL Emergency Generator RICE (G1)

Horsepower	1,175	hp
Brake Specific Fuel Consumption	7,733	Btu/Bhp-hr
Total Heat Input	9.09	MMBtu/hr
Operating Hours	500	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	4.45	MMscf/yr
	8,908	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO_x	5.69E-01	4.40E-03	5.17	1.29	Vendor Data
CO	3.70E-01	2.86E-03	3.36	0.84	Vendor Data
PM_{10}	7.71E-05	5.96E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
$PM_{2.5}$	7.71E-05	5.96E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
VOC	1.42E-02	1.10E-04	0.13	0.03	Vendor Data
SO_2 (Maximum Hourly)	0.0571	4.42E-04	0.52		20 grains S / 100 scf
SO_2 (Average Annual)	0.000714	5.52E-06		<0.01	0.25 grains S / 100 scf
CO_2	116.977	9.05E-01	1,062.89	265.72	40 CFR Subpart C
CH_4	0.002205	1.70E-05	0.02	<0.01	40 CFR Subpart C
N_2O	0.000220	1.70E-06	<0.01	<0.01	40 CFR Subpart C
1,3-Butadiene	2.67E-04	2.06E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Methanol	2.50E-03	1.93E-05	0.02	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Hexane	1.11E-03	8.58E-06	0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Benzene	4.40E-04	3.40E-06	0.00	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Toluene	4.08E-04	3.16E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Ethylbenzene	3.97E-05	3.07E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Acetaldehyde	8.36E-03	6.46E-05	0.08	0.02	AP-42 Table 3.2-2 (10/24) - 4SLB
Acrolein	5.14E-03	3.97E-05	0.05	0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
2,2,4-Trimethylpentane	2.50E-04	1.93E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Xylene	1.84E-04	1.42E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Formaldehyde	5.28E-02	4.08E-04	0.48	0.12	AP-42 Table 3.2-2 (10/24) - 4SLB
CO_2e	117.1		1,063.98	265.99	40 CFR 98 Subpart C
Total HAPs	0.07219		0.66	0.16	AP-42 Table 3.2-2 (10/24) - 4SLB

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2 Table 3.2-2 references are from the October 2024 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 500 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Fuel Gas Heater (H1)

Heat Input	1.50	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	12.88	MMscf/yr
	1470.6	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.15	0.64	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.12	0.54	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	0.01	0.05	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.04	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.09		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	175.47	768.54	40 CFR Subpart C
CH_4		0.002205	<0.01	0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	175.65	769.33	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Fuel Gas Heater (H2)

Heat Input	0.80	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	6.87	MMscf/yr
	784.3	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.08	0.34	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.07	0.29	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	<0.01	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.05		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	93.58	409.89	40 CFR Subpart C
CH_4		0.002205	<0.01	<0.01	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	93.68	410.31	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	<0.01	AP-42 Table 1.4-3 & 4 (7/98)

Notes:

- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Catalytic Heaters (SH1)

Heat Input	2.880	MMBtu/hr (total)
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	24.73	MMscf/yr
	2823.5	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.28	1.24	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.24	1.04	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.002	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.006	0.02	0.07	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.02	0.07	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.16		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	336.89	1475.60	40 CFR Subpart C
CH_4		0.002205	<0.01	0.03	40 CFR Subpart C
N_2O		0.000220	<0.01	<0.01	40 CFR Subpart C
Hexane	1.800	0.001765	<0.01	0.02	AP-42 Table 1.4-3 (7/98)
Benzene	0.002100	0.000002	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Toluene	0.003400	0.000003	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
Formaldehyde	0.075	0.00007	<0.01	<0.01	AP-42 Table 1.4-3 (7/98)
CO_2e		117.1	337.24	1477.11	40 CFR 98 Subpart C
Total HAPs	1.89	0.00185	<0.01	0.02	AP-42 Table 1.4-3 & 4 (7/98)

Notes:
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO_2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated April 2024 and effective January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Fugitive Emissions from Leaks

Number of Compressors: 4

Component	Facility Components	Estimated Leaking Components[2]	Emission Factor[3]	Fugitive Emissions							
				Total	CH_4[4]	CO_2[4]	CH_4[5]	CO_2[5]	CO_2e[6]	VOC[7]	HAPs[8]
			scf / hr / component	scf/yr	scf/yr	scf/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service											
Valve	435	9	9.6	756864.00	676499.95	1444.04	14.32	0.08	400.98	0.18	<0.01
Connector	670	14	4.9	600936.00	537128.44	1146.54	11.37	0.07	318.37	0.14	<0.01
Flange	202	5	6.9	302220.00	270130.19	576.61	5.72	0.03	160.11	0.07	<0.01
Pressure Relief Valve	13	1	7.8	68328.00	61072.91	130.36	1.29	<0.01	36.20	0.02	<0.01
Meter	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Other	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Non-Compressor Service											
Valve	736	15	9.6	1,261,440.00	1,127,499.92	2,406.74	23.86	0.14	668.30	0.29	<0.01
Connector	1630	33	4.9	1,416,492.00	1,266,088.45	2,702.56	26.80	0.16	750.44	0.33	<0.01
Flange	460	10	6.9	2,417,760.00	2,161,041.52	4,612.91	45.74	0.27	1,280.90	0.56	<0.01
Pressure Relief Valve	13	1	7.8	273,312.00	244,291.65	521.46	5.17	0.03	144.80	0.06	<0.01
Meter	8	1	9.1	318,864.00	285,006.92	608.37	6.03	0.04	168.93	0.07	<0.01
Other	18	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
						Total:	140.29	0.82	3,929.04	1.72	<0.01

Notes:

1. Estimated component leaks per compressor based on average measurements throughout the Columbia pipeline system.
2. Estimated number of leaking components utilizing a 2% component leak rate factor throughout the Columbia pipeline system obtained from fugitive leak survey results at Columbia facilities, and rounded up to the nearest integer.
3. Emission factors from 40 CFR 98 Subpart W Table W-2 (Updated April 2024 and effective January 2025).
4. CH_4 and CO_2 emission rates based on 89.38 vol% CH_4 and 0.19 vol% CO_2 in Sherwood natural gas data
5. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
6. Based on 40 CFR 98 Subpart A Global Warming Potentials (Updated April 2024 and effective January 2025).
7. Based on a 0.012 mol ratio of VOC to methane as calculated from Sherwood gas composition data
8. Based on a 1.37E-10 ratio of HAPs to methane as calculated from Sherwood gas composition data

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Gas Loss Emissions

Component	Emission Rate (ton/yr)				
	CH_4 [1]	CO_2	CO_2e	VOC [2]	HAPs [3]
Equipment Blowdowns	655.74	3.83	18,364.63	8.04	<0.01
Pigging Blowdowns	17.65	0.10	494.42	0.22	<0.01
Station Emergency Shutdown	86.83	0.51	2,431.74	1.06	<0.01
Blowdown, Total	760.23	4.45	21,290.79	9.32	<0.01

Notes:
1. CH_4 emission rates based on 89.38 vol% CH_4 in annualized Sherwood natural gas data
2. Based on a 0.012 mol ratio of VOC to methane as calculated from Sherwood gas composition data
3. Based on a 1.37E-10 ratio of HAPs to methane as calculated from Sherwood gas composition data

Sherwood Facility Wide Emergency Shutdown (ESD) PTE Emission Calculations
Blowdown Emissions per Event (mscf/event): 2,295.0
Blowdown Events per Year: 2

Parameter	Gas Loss from ESD (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
ESD Emissions	4,590.0	4,102.63	8.76	86.83	0.51	2,431.74	1.06	0.000

Notes:
- Gas loss volume based on TC Energy Engineering Department calculations using estimated facility piping volume, the average suction pressure, and discharge at MAOP. This volume would also be used when reporting ESD gas loss events at Sherwood to PHMSA.

Compressor Startup/Shutdown PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
Unit 1-2	100	216.0	21,600	19,307	41.21	408.61	2.39	11,443.46	5.01	<0.01
Unit 3-4	100	104.0	10,400	9,296	19.84	196.74	1.15	5,509.81	2.41	<0.01
Filter Separators A-C	9	264.0	2,376	2,124	4.53	44.95	0.26	1,258.78	0.55	<0.01
Filter Separators D-E	6	48.0	288	257	0.55	5.45	0.03	152.58	0.07	<0.01
Total	--	--	34,664	30,983	66.14	655.74	3.83	18,364.63	8.04	<0.01

Pigging PTE Emission Calculations

Unit	Blowdown Count	Average Gas Loss per Event for Unit (mscf/event)	Annual Gas Loss from Unit (mscf/yr)	CH_4 Gas Loss (mscf/yr)	CO_2 Gas Loss (mscf/yr)	CH_4 Emissions (ton/yr)	CO_2 Emissions (ton/yr)	CO_2e Emissions (ton/yr)	VOC Emissions (ton/yr)	HAPs Emissions (ton/yr)
LR9003 (30" x 24" Barrel) L&R	12	12.2	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LR9002 (42" x 36" Barrel) L&R	12	35.1	421	377	0.80	7.97	0.05	223.21	0.10	<0.01
LR9002 (42" x 36" Barrel) L&R	12	42.7	512	458	0.98	9.68	0.06	271.21	0.12	<0.01
Total	--	--	933	834	1.78	17.65	0.10	494.42	0.22	<0.01

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Natural Gas Composition

Representative Composition of Natural Gas

Natural Gas Composition	Molar Fraction[1] (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
Nitrogen	0.48	28.01	0.1339	0.7605
Carbon Dioxide	0.19	44.01	0.0840	0.4769
Methane	89.38	16.04	14.3395	81.4490
Ethane	9.55	30.07	2.8723	16.3146
Propane	0.39	44.10	0.1731	0.9831
iso-Butane	0.0026	58.12	0.0015	0.0086
n-Butane	0.0022	58.12	0.0013	0.0073
iso-Pentane	0.00	72.15	0.0000	0.0000
n-Pentane	0.00	72.15	0.0000	0.0000
C_{6+} Components	0.00	89.09	0.0000	0.0000
Total	100.00	-	17.61	100.00

C_{6+} HAP Composition[2]	Molar Fraction (mole %)	Molecular Weight (lb/lb-mole)	Weighted Sum (lb/lb-mole)	Weight Fraction (weight %)
2,2,4-Trimethylpentane	1.11E-10	114.23	1.27E-10	7.20E-10
Benzene	1.21E-10	78.11	9.45E-11	5.37E-10
Ethylbenzene	5.00E-12	106.17	5.31E-12	3.02E-11
n-Hexane	1.88E-09	86.18	1.62E-09	9.22E-09
Toluene	8.10E-11	92.14	7.46E-11	4.24E-10
Xylenes	4.00E-11	106.17	4.25E-11	2.41E-10
Total HAPs	2.24E-09	-	1.97E-09	1.12E-08

Totals	Mol %	Weight %
Total VOCs	0.40	1.00
Total HAPs	2.24E-09	1.12E-08

Ratios	Mol	Weight
VOC / Methane Ratio	4.45E-03	1.23E-02
HAPs / Methane Ratio	2.51E-11	1.37E-10

Mass Fraction Conversion Data

Compound	Mol Weight (g/mol)	Mass in Gas Sample (g)		Mass %
CO_2	44.01	8.40	0.0048	0.4770
N_2	28.02	13.39	0.0076	0.7608
Methane	16.04	1433.69	0.8145	81.4461
Ethane	30.07	287.23	0.1632	16.3171
Propane	44.09	17.31	0.0098	0.9831
I-Butane	58.12	0.15	0.0001	0.0086
N-Butane	58.12	0.13	0.0001	0.0073
I-Pentane	72.15	0.00	0.0000	0.0000
N-Pentane	72.15	0.00	0.0000	0.0000
Other hexanes	86.18	0.00	0.0000	0.0000
n-hexane	86.18	0.00	0.0000	0.0000
2,2,4 - Trimethylpentane	114.23	0.00	0.0000	0.0000
Benzene	78.11	0.00	0.0000	0.0000
Toluene	92.14	0.00	0.0000	0.0000
Ethylbenzene	106.17	0.000	0.0000	0.0000
Xylenes	106.17	0.00	0.0000	0.0000

Notes:

1. Natural gas analysis obtained from gas chromatograph readings from site data sheet.
2. C_{6+} HAP composition molar fractions were derived from the GRI-GLYCALC v4.0 C_{6+} analysis multipliers for the Natural Gas Transmission Industry Segment.

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Pipeline Liquids Tank A01 - Insignificant Source

Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
CH_4	1.37	6.00
CO_2	0.15	0.65
Propane	0.05	0.21
Isobutane	0.01	0.06
n-Butane	<0.01	0.02
Isopentane	<0.01	<0.01
n-Pentane	<0.01	<0.01
Hexane	<0.01	<0.01
Heptane	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
C_{6+}	<0.01	<0.01
VOCs	0.07	0.29
Total HAPs	<0.01	<0.01
CO_2e	38.48	168.54

Notes:
- Tank emission rates were calculated using Promax software. Promax output emissions are attached.
- Emission profiles shown above are for one (1) 2,056 gallon Condensate Tanks with 12 Turnovers per year.

Columbia Gas Transmission, LLC Sherwood
Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source

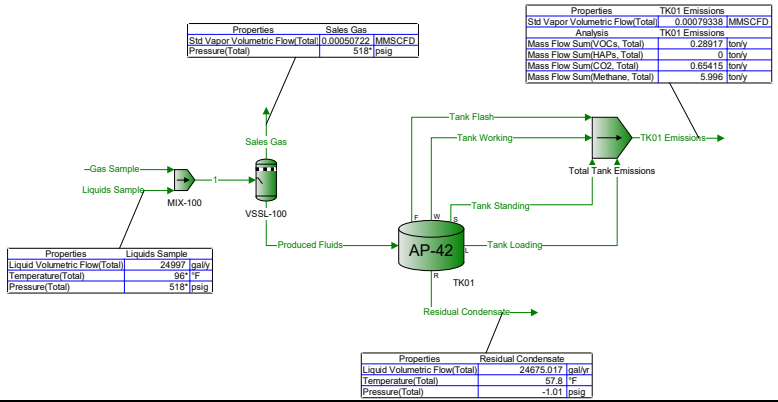
Air Contaminant	Emission Rates	
	Hourly (lb/hr)	Annual (tpy)
VOCs	<0.01	<0.01
Total HAPs	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
m-Xylene	<0.01	<0.01
n-Hexane	<0.01	<0.01
2,2,4-Trimethylpentane	<0.01	<0.01
CH_4	<0.01	<0.01
CO_2	<0.01	<0.01
CO_2e	0.00	0.01

Notes:
- Tank emission rates were estimated using Emission Master. Emission Master output is attached.
- Emission profiles shown above are for one (1) 1,000 gallon Wastewater Storage Tank with 12 Turnovers per year.

2056 gal
Plant Schematic

Client Name:	TC Energy	Job: Condensate Tank Emissions
Location:	Sherwood Station	
Flowsheet:	2056 gal	

TC Energy
Elk River Station
TK01 Condensate Tank Emissions



* User Specified Values
? Extrapolated or Approximate Values

Columbia Gas Transmission, LLC Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Assumptions

	Wastewater Tank
Capacity (gal)	1,000
Turnovers	12
Composition	100% Mineral Oil
Location	Charleston, WV
Height	3.49118433
Diameter	6.98236866

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source Emission
Master Calculations - Fixed Roof Tanks

Tank ID	Storage Tank Paramenters										
	Vessel Type	Diameter D (ft)	Straight Side (ft)	Roof Height (ft)	Effective Tank Height (ft)	Void Volume (gal)	Maximum Working Volume (gal)	Isothermal Yes/No	Conservation Vent Low (psig)	High (psig)	Paint Solar Absorptance dimensionless
Wastewater Tank A03	Horizontal Storage	6.9824	3.4912	N/A	N/A	1000	1000	Normal	-0.03	0.03	0.25

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Material Stored			Annual Standing Storage Losses (Uncontrolled)				
	Material Type	Material Name	Composition Reference	Vapor Space Vv (ft^3)	Vapor Density Wv (lb/ft^3)	Vapor Space Expansion Factor KE dimensionless	Vented Vapor Saturation Factor Ks dimensionless	VOC Standing Losses Ls (lb/yr)
Wastewater Tank A03	Compound	Mineral Oil (White)	composition link	66.8856	0.001633333	0.037708333	0.993166667	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Annual Working Losses (Uncontrolled)							
	Tla (°F)	Vapor Molecular Weight Mv (lb/lb-mole)	VP at Tla Pva (psia)	Throughput Q (gal/yr)	Q (bbl/yr)	Turnover Factor Kn dimensionless	Crude Oil Factor Kp dimensionless	Working Losses VOC Lw (lb/yr)
Wastewater Tank A03	57.10931667	194.27	0.04715833	12000	285.7143	1	1	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Fixed Roof Tanks

Tank ID	Loading Operation			Annual Emissions		Annual Emissions	
	Pump-In Rate (gph)	VOC Rate Uncontrolled (lb/hr)	VOC Rate Controlled (lb/hr)	Uncontrolled VOC (lb)	Controlled VOC (lb)	Uncontrolled VOC (tpy)	Controlled VOC (tpy)
Wastewater Tank A03				0.000	0	0.000	0

Columbia Gas Transmission, LLC
Sherwood Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A03 - Insignificant Source
Emission Master Calculations - Wastewater Tank

Activity Title	Wastewater emissions
Climate	West Virginia, Charleston
pa	14.2535 psia
Equipment Tag	Wastewater Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Normal Storage Tank (11/2019 Rev.)

Working and Breathing Loss Calculation	
Void Space Volume	1000 gal
Working Volume	1000 gal
Working Volume	133.6806 ft^3
Shell Diameter	6.9824 ft
Straight Side Height	3.4912 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0.03
pbv	-0.03
Equipment Comment	
Activity Comment	
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents	500.000 gal	20.000 °C	3429.959 lb		17.656 lb-M	

Mixture Name:	Mixture						
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
	Mineral Oil (White)	2.1714	3429.9594	1	17.6556	1	1	2.1714

Kp (product factor)	1

Month		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		
Q	(gal)	1016.3934	950.8197	1016.393	983.6066	1016.393	983.6066	1016.3934	1016.393	983.6066	1016.393	983.6066	1016.393	12000	(sum)
Vq	(ft^3)	135.872	127.1061	135.872	131.4891	135.872	131.4891	135.872	135.872	131.4891	135.872	131.4891	135.872	1604.167	(sum)
N (period)	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
N (scaled to annual)	(number)	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	11.9672	143.6064	(sum)
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(avg)
Days	(number)	31	29	31	30	31	30	31	31	30	31	30	31	366	(sum)
Compound Molecular Weights (lb/lb-M)															
Mineral Oil (White)	(Mv)	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	(lb/lb-mole)
Compound Vapor Pressures (Pva)															
Mineral Oil (White)	(mmHg)	2.1714	2.1714	2.1714	2.1714	2.1714	2.9375	3.5041	3.2718	2.1714	2.1714	2.1714	2.1714	2.438	(avg)
Working Loss Calculations (Uncontrolled)															
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(average)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(average)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(average)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(average)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(average)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(average)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(average)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(average)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(average)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(average)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(average)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
n	(number)	1.0164	0.9508	1.0164	0.9836	1.0164	0.9836	1.0164	1.0164	0.9836	1.0164	0.9836	1.0164	12	(sum)
Compound Vapor Density (vW(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Working Losses (Lw)															
Air	(lb)	10.5746	9.8171	10.2683	9.7543	9.9042	9.4283	9.6721	9.7009	9.5222	10.0677	9.9353	10.4738	119.1188	(sum)
Mineral Oil (White)	(lb)	0.2094	0.1943	0.2031	0.1929	0.1958	0.2523	0.3091	0.2894	0.1883	0.1992	0.1967	0.2074	2.6379	(sum)
Breathing Loss Calculations (Uncontrolled)															
tan	(°R)	482.67	485.37	494.67	502.47	511.17	519.47	524.07	523.07	516.17	503.87	495.97	487.67	503.8867	(avg)
taa	(°R)	491.77	495.17	505.52	514.47	523.17	531.12	534.72	533.57	527.32	515.87	506.47	496.67	514.6533	(avg)
tax	(°R)	500.87	504.97	516.37	526.47	535.17	542.77	545.37	544.07	538.47	527.87	516.97	505.67	525.42	(avg)
tLn	(°F)	29.1967	32.4526	42.5856	51.2816	60.1011	68.2323	72.1491	70.979	64.364	52.4707	43.4305	34.0899	51.77776	(avg)
tLa	(°F)	33.1642	36.9455	47.864	57.3749	66.5263	74.698	78.1729	76.7484	69.979	57.9783	47.9542	37.9061	57.10932	(avg)
tLx	(°F)	37.1316	41.4383	53.1423	63.4682	72.9516	81.1638	84.1966	82.5177	75.5939	63.4858	52.4779	41.7224	62.44084	(avg)
i	(Btu/ft²day)	625.9737	850.2836	1184.686	1514.647	1780.202	1910.6	1836.9933	1675.503	1369.972	1046.039	678.9578	533.0136	1250.573	(avg)
tb	(°R)	492.2395	495.8077	506.4085	515.606	524.5052	532.5529	536.0977	534.8266	528.3475	516.6545	506.9792	497.0698	515.5913	(avg)
pC	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
pNc	(psia)	14.2115	14.2115	14.2115	14.2115	14.2115	14.1967	14.1857	14.1902	14.2115	14.2115	14.2115	14.2115	14.20634	(avg)
pVa	(psia)	0.042	0.042	0.042	0.042	0.042	0.0568	0.0678	0.0633	0.042	0.042	0.042	0.042	0.047158	(avg)
dPv	(psia)	0	0	0	0	0.0093	0.0352	0.038	0.0364	0.0176	0	0	0	0.011375	(avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	(avg)
dTv	(°R)	15.8699	17.9714	21.1134	24.3732	25.701	25.863	24.095	23.0775	22.4599	22.0302	18.0948	15.2651	21.3262	(avg)
hVo	(ft)	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	2.742	(avg)
ks	(number)	0.9939	0.9939	0.9939	0.9939	0.9939	0.9918	0.9902	0.9909	0.9939	0.9939	0.9939	0.9939	0.993167	(avg)
Vv	(ft^3)	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	66.8856	(avg)
wVnc	(number)	0.0778	0.0772	0.0756	0.0742	0.0729	0.0717	0.0712	0.0714	0.0724	0.0741	0.0756	0.0771	0.074267	(avg)
kE	(number)	0.028	0.032	0.0374	0.0429	0.0453	0.0467	0.0432	0.0414	0.0394	0.0383	0.0314	0.0265	0.037708	(avg)
tv	(°R)	493.3193	497.2745	508.4521	518.2188	527.576	535.8487	539.2666	537.7169	530.7107	518.4589	508.1504	497.9892	517.7485	(avg)
plx	(psia)	0.042	0.042	0.042	0.042	0.0513	0.0772	0.0868	0.0815	0.0596	0.042	0.042	0.042	0.0542	(avg)
pln	(psia)	0.042	0.042	0.042	0.042	0.042	0.042	0.0488	0.0451	0.042	0.042	0.042	0.042	0.042825	(avg)
Compound Vapor Density (wV(i))															
Mineral Oil (White)	(lb/ft^3)	0.0015	0.0015	0.0015	0.0015	0.0014	0.0019	0.0023	0.0021	0.0014	0.0015	0.0015	0.0015	0.001633	(avg)
Breathing Losses (Ls)															
Air	(lb)	4.5151	4.7889	5.8571	6.3885	6.8431	6.7124	6.3834	6.1225	5.7289	5.8899	4.7644	4.2287	68.2229	(sum)
Mineral Oil (White)	(lb)	0.0889	0.0942	0.1152	0.1256	0.1344	0.1782	0.202	0.181	0.1126	0.1158	0.0938	0.0832	1.5249	(sum)
Total Losses (Lt)															
Air	(lb)	15.0897	14.6059	16.1254	16.1428	16.7472	16.1406	16.0555	15.8234	15.2511	15.9576	14.6997	14.7026	187.3415	(sum)
Mineral Oil (White)	(lb)	0.2982	0.2885	0.3183	0.3184	0.3302	0.4305	0.5111	0.4704	0.301	0.3151	0.2905	0.2906	4.1628	(sum)