Mullins, Robert A <robert.a.mullins@wv.gov>

RE: [EXTERNAL] R30-03900670-2025 Pre-Draft

1 message

David Keatley <david_keatley@tcenergy.com> Mon, Mar 31, 2025 at 1:59 PM
To: "Mullins, Robert A" <robert.a.mullins@wv.gov>

No Comments

From: Mullins, Robert A <robert.a.mullins@wv.gov>
Sent: Monday, March 17, 2025 9:48 AM
To: David Keatley <david_keatley@tcenergy.com>
Subject: [EXTERNAL] R30-03900670-2025 Pre-Draft

David,

Attached is the Pre-Draft Title V Permit and Factsheet for the Elk River Compressor Station's Title V renewal. Please review and respond with any questions/comments by March 31, 2025 so that I can address any question/comments before sending the permit out to Notice.

Thanks,

--

Robert Mullins

WV Department of Environmental Protection

Division of Air Quality

601 57th Street, SE

Charleston, WV 25304

Phone: (304)926-0499 ext. 41286

Mullins, Robert A <robert.a.mullins@wv.gov>

R30-03900670-2025 Pre-Draft

1 message

Mullins, Robert A <robert.a.mullins@wv.gov> Mon, Mar 17, 2025 at 9:48 AM
To: David Keatley <david_keatley@tcenergy.com>

David,

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Thanks,
--

Robert Mullins

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601 57th Street, SE

Charleston, WV 25304

Phone: (304)926-0499 ext. 41286

2 attachments

Pre-DPFactSheet_R30-03900670-2025.pdf
279K

Pre-DPPermit R30-03900670-2025.pdf
880K

Mullins, Robert A <robert.a.mullins@wv.gov>

Read: Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025

1 message

Michael Dearing <Michael.Dearing@erm.com> Thu, Jan 2, 2025 at 9:33 AM
To: "robert.a.mullins@wv.gov" <robert.a.mullins@wv.gov>

---------- Forwarded message ----------
From: Michael Dearing <Michael.Dearing@erm.com>
To: "robert.a.mullins@wv.gov" <robert.a.mullins@wv.gov>
Cc:
Bcc:
Date: Thu, 2 Jan 2025 14:33:29 +0000
Subject: Read: Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025

winmail.dat
7K

Mullins, Robert A <robert.a.mullins@wv.gov>

Read: [EXTERNAL] Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025

1 message

David Keatley <david_keatley@tcenergy.com> Mon, Dec 30, 2024 at 3:37 PM
To: "robert.a.mullins@wv.gov" <robert.a.mullins@wv.gov>

Your message

To: David Keatley
Subject: [EXTERNAL] Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025
Sent: Monday, December 30, 2024 2:37:32 PM (UTC-05:00) Eastern Time (US & Canada)

was read on Monday, December 30, 2024 3:36:06 PM (UTC-05:00) Eastern Time (US & Canada).

Mullins, Robert A <robert.a.mullins@wv.gov>

Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025

1 message

Mullins, Robert A <robert.a.mullins@wv.gov> Mon, Dec 30, 2024 at 2:37 PM
To: timothy_chambers@tcenergy.com, David Keatley <david_keatley@tcenergy.com>, Michael Dearing <Michael.Dearing@erm.com>

From	Robert Mullins
To	Timothy Chambers; David J. Keatley; Micheal Dearing
Subject	Completeness Determination, Elk River Compressor Station, Application No. R30-03900670-2025

Your Title V renewal application for a permit to operate the above referenced facility was received by this Division on November 15, 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,

--

Robert Mullins

WV Department of Environmental Protection

Division of Air Quality

601 57th Street, SE

Charleston, WV 25304

Phone: (304)926-0499 ext. 41286

WV DAQ Title V Permit Application Status for Columbia Gas Transmission, LLC; Elk River Compressor Station

3 messages

Mink, Stephanie R <stephanie.r.mink@wv.gov> Mon, Nov 18, 2024 at 1:16 PM
To: timothy_chambers@tcenergy.com, David Keatley <david_keatley@tcenergy.com>
Cc: Carrie McCumbers <carrie.mccumbers@wv.gov>, Robert A Mullins <robert.a.mullins@wv.gov>

RE: Application Status

Columbia Gas Transmission, LLC

Elk River Compressor Station

Facility ID No. 039-00670

Application No. R30-03900670-2025

Dear Mr. Chambers,

Your application for a Title V Permit Renewal for Columbia Gas Transmission, LLC's Elk River Compressor Station was received by this Division on November 15, 2024, and was assigned to Robert "R.A."Mullins.

Should you have any questions, please contact the assigned permit writer, Robert "R.A."Mullins, at 304-926-0499, extension 41286, or Robert.A.Mullins@wv.gov .

--

Stephanie Mink

Environmental Resources Associate

West Virginia Department of Environmental Protection

Division of Air Quality, Title V & NSR Permitting

601 57th Street SE

Charleston, WV 25304

Phone: 304-926-0499 x41281

McCumbers, Carrie <carrie.mccumbers@wv.gov> Mon, Nov 18, 2024 at 1:34 PM
To: stephanie.r.mink@wv.gov

Your message

To: McCumbers, Carrie
Subject: WV DAQ Title V Permit Application Status for Columbia Gas Transmission, LLC; Elk River Compressor Station
Sent: 11/18/24, 1:16:53 PM EST

was read on 11/18/24, 1:34:12 PM EST

David Keatley <david_keatley@tcenergy.com> Mon, Nov 18, 2024 at 1:52 PM
To: "stephanie.r.mink@wv.gov" <stephanie.r.mink@wv.gov>

Your message

To: David Keatley
Subject: [EXTERNAL] WV DAQ Title V Permit Application Status for Columbia Gas Transmission, LLC; Elk River Compressor Station
Sent: Monday, November 18, 2024 1:16:53 PM (UTC-05:00) Eastern Time (US & Canada)

was read on Monday, November 18, 2024 1:52:07 PM (UTC-05:00) Eastern Time (US & Canada).

WV DAQ Title V Reminder Letter for Columbia Gas Transmission, LLC; Elk River Compressor Station

3 messages

Mink, Stephanie R <stephanie.r.mink@wv.gov> Tue, Aug 27, 2024 at 1:51 PM
To: timothy_chambers@tcenergy.com, David Keatley <david_keatley@tcenergy.com>
Cc: Carrie McCumbers <carrie.mccumbers@wv.gov>

RE: Title V Permit Renewal Application

Columbia Gas Transmission, LLC

Elk River Compressor Station

Permit No.: R30-03900670-2020

Plant ID No.: 039-00670

Dear Mr. Chambers:

On June 1, 2020, the WV Department of Environmental Protection Division of Air Quality issued a Title V permit to Columbia Gas Transmission, LLC's Elk River Compressor Station. Our records indicate that this Title V permit will expire on June 1, 2025, and a Title V permit renewal application is due for submittal on or before December 1, 2024.

In accordance with 45CSR§30-4.1.a.3, a permit renewal application is **timely** if it is submitted at least six (6) months prior to the date of permit expiration. Please bear in mind, the permit application must also be **complete** six (6) months prior to the permit expiration date. Refer to 45CSR§30-4.1.b for what constitutes a complete application. **Please note that as of March 16, 2020, the Division of Air Quality requests that all applications be submitted via email.** Instructions can be found at https://dep.wv.gov/daq/permitting/Pages/TitleVGuidanceandForms.aspx.

Please ensure the **timely** and **complete** submittal of the permit renewal application. An application shield will only be granted for an application which is **timely** and **complete**.

Should you have any questions, please contact me or Carrie McCumbers, Title V Program Manager, at 304-926-0499, ext. 41278.

--

Stephanie Mink

Environmental Resources Associate

West Virginia Department of Environmental Protection

Division of Air Quality, Title V & NSR Permitting

601 57th Street SE

Charleston, WV 25304

Phone: 304-926-0499 x41281

David Keatley <david_keatley@tcenergy.com> Tue, Aug 27, 2024 at 1:58 PM
To: "stephanie.r.mink@wv.gov" <stephanie.r.mink@wv.gov>

Your message

To: David Keatley
Subject: [EXTERNAL] WV DAQ Title V Reminder Letter for Columbia Gas Transmission, LLC; Elk River Compressor Station
Sent: Tuesday, August 27, 2024 1:51:46 PM (UTC-05:00) Eastern Time (US & Canada)

was read on Tuesday, August 27, 2024 1:57:27 PM (UTC-05:00) Eastern Time (US & Canada).

Timothy Chambers <timothy_chambers@tcenergy.com> Tue, Aug 27, 2024 at 3:14 PM
To: "stephanie.r.mink@wv.gov" <stephanie.r.mink@wv.gov>

Your message

To: Timothy Chambers
Subject: [EXTERNAL] WV DAQ Title V Reminder Letter for Columbia Gas Transmission, LLC; Elk River Compressor Station
Sent: Tuesday, August 27, 2024 1:51:46 PM (UTC-05:00) Eastern Time (US & Canada)

was read on Tuesday, August 27, 2024 3:14:27 PM (UTC-05:00) Eastern Time (US & Canada).

Received
November 15, 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; Elk River Compressor Station
[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 039-00670
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R30-03900670-2020 (MM01), R13-3294C

- 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) Application:
  - ☐ Title V Initial
  - ☑ Title V Renewal
  - ☐ Administrative Amendment**
  - ☐ Minor Modification**
  - ☐ Significant Modification**
  - ☐ Off Permit Change

****If the box above is checked, include the Title V revision information as ATTACHMENT S to the combined NSR/Title V 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:

Elk River Compressor Station

Title V Renewal Application

PREPARED FOR

Columbia Gas Transmission, LLC

DATE
October 31, 2024

REFERENCE
0716980

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

October 31st, 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)
Elk River Compressor Station (WVDAQ Facility ID: 039-00670)
Title V Operating Permit Renewal Application

Ms. Crowder,

Columbia operates a Natural Gas Compressor Station in Elk River, West Virginia. The facility currently maintains an NSR Permit No. R13-3294C under 45CSR13 and a Title V Permit No. R30-03900670-2020 under 45CSR30. The current Title V Permit to Operate expires on June 1, 2025.

This package contains the general application forms along with the required attachments for a Title V renewal permit application. Elk River Compressor Station's Potential to Emit (PTE) exceeds 100 tons per year for Carbon Monoxide (CO). For this reason, Elk River 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:** Elk River Compressor Station
3. DAQ Plant ID No.: 0 3 9 — 0 0 6 7 0	**4. Federal Employer ID No. (FEIN):** 3 1 0 8 0 2 4 3 5

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence? 09/25/2018
☒ Permit Renewal — What is the expiration date of the existing permit? 06/01/2025
☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

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

8. Number of onsite employees:

<10

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.

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: 10450 Elk River Rd North	**City:** Clendenin	**County:** Kanawha
UTM Easting: 472.0 km	**UTM Northing:** 4,259.9 km	**Zone:** ☒ 17 or ☐ 18
Directions: From Charleston travel north on I79 to exit 19. Take exit 19 and take US 119 south until you reach Clendenin. In Clendenin turn onto SR 4 east for approximately 1.5 miles until you reach the site on the right.		
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: Timothy Chambers		**Title:** Manager of Operations
Street or P.O. Box: State Route 4		
City: Clendenin	**State:** WV	**Zip:** 25045
Telephone Number:	**Cell Number:**	
E-mail address: timothy_chambers@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.

Elk River Compressor Station is a natural gas transmission and compression 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 three (3) 15,600-hp Solar Mars 100 turbine compressor engines, one (1) 880-hp Waukesha VGF-L36GL emergency generator RICE, one (1) 0.50-MMBtu/hr Fuel Gas heater, one (1) 0.25-MMBtu/hr Fuel Gas heater, Catalytic heaters with an estimated total heat output of 2.404-MMBtu/hr, one (1) 1,000-gal wastewater storage tank, and four (4) 2,500-gal pipeline liquids storage tanks.

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*).

- R13-3294C Condition 3.1.4: Do not discharge air pollutants which cause or contribute to an objectionable odor. [45CSR§4-3.1]
- R13-3294C Condition 3.3: Conduct stack tests as required and submit a report of the results within 60 days after test completion. [45CSR13]
- R13-3294C Condition 3.5.4.1: Operating Permit Program, the permittee shall pay fees on an annual basis in accordance with 45CSR§30-8. A receipt for the appropriate fee shall be maintained on the premises for which the receipt has been issued and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative. [45CSR30]

☐ 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.)

- R13-3294C Condition 3.4.1: Maintain records of all information required by the permit for at least five years.
- R13-3294C 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]

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)*
R13-3294C	07/09/2024	
R30-03900670-2020 (MM01)	06/04/2024	

22. Inactive Permits/Obsolete Permit Conditions		
Permit Number	Date of Issuance MM/DD/YYYY	Permit Condition Number

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	243.74
Nitrogen Oxides (NO_X)	99.30
Lead (Pb)	-
Particulate Matter ($PM_{2.5}$)[1]	11.67
Particulate Matter (PM_{10})[1]	11.67
Total Particulate Matter (TSP)	11.67
Sulfur Dioxide (SO_2)	1.26
Volatile Organic Compounds (VOC)	42.48
Hazardous Air Pollutants[2]	Potential Emissions
Total HAPs	2.24
Formaldehyde	1.33
Toluene	0.21
Xylene	0.10
Regulated Pollutants other than Criteria and HAP	Potential Emissions
CO_2e	216,592.35

[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	HAPs	
	lb/hr	ton/year
Wastewater Tank A05	<0.01	<0.01
Pipeline Liquids Tanks A01	<0.01	<0.01
Pipeline Liquids Tanks A02	<0.01	<0.01
Pipeline Liquids Tanks A03	<0.01	<0.01
Pipeline Liquids Tanks A04	<0.01	<0.01
Totals	**<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: Timothy Chambers	Title: Manager of Operations

Responsible official's signature:

Signature: _____ Signature Date: 11/13/2024

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

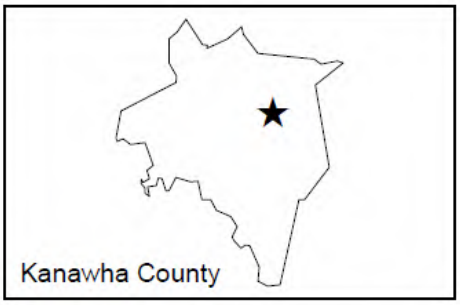
Note: Please check all applicable attachments included with this permit application:

☒	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

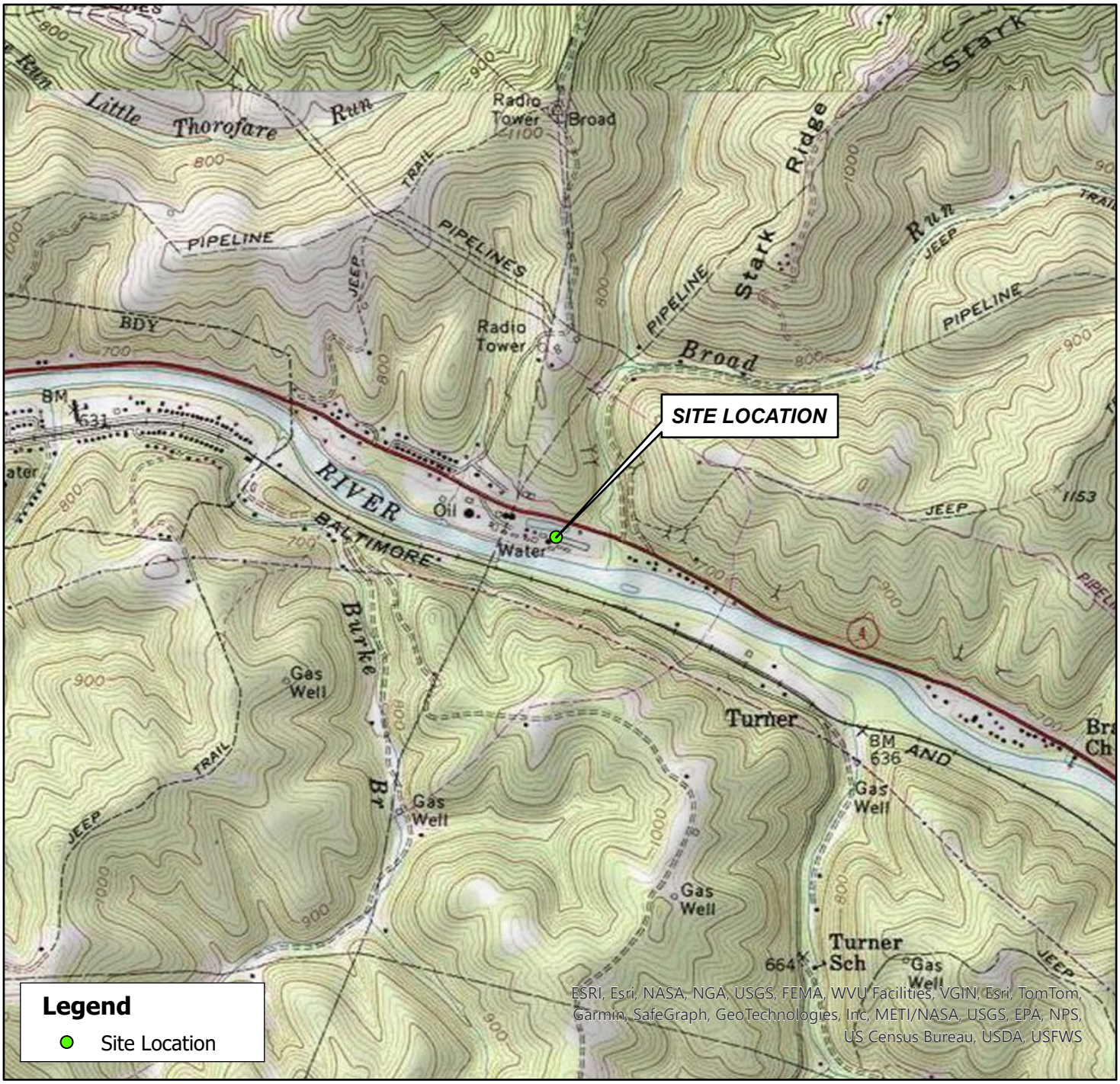
Area Map



0 1,000 2,000 3,000 4,000
US Feet

N

LAT. 38.487002 LON. -81.321051
KANAWHA COUNTY
WEST VIRGINIA



Legend

- Site Location

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

SITE LOCATION MAP

Columbia Gas Transmission, LLC

Elk River Compressor Station
10450 Elk River Road North
Clendenin, WV 25045

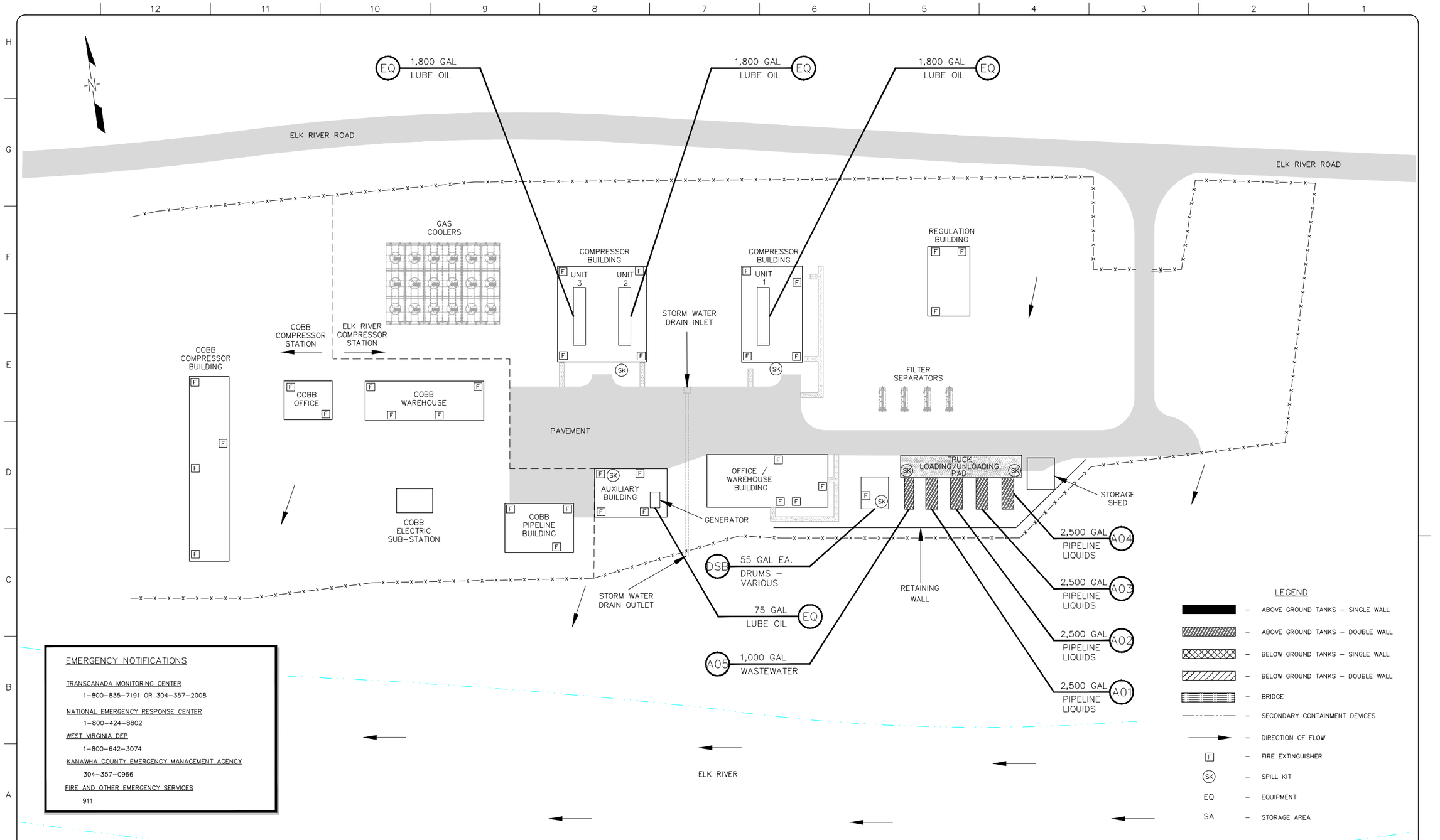
ERM		GIS Review: SV
		CHK'D: SV
		0716980
Drawn By: ECLW - 07/10/24	**Environmental Resources Management**	ATTACHMENT A

Source: USGS Topoographic Map; WGS 1984 Web Mercator Auxiliary Sphere

Z:\US\Projects\S-U\TC_Energy_ArcGIS\D-F\Elk_River_Compressor_Station\Elk_River_Compressor_Station_20231227\Elk_River_Compressor_Station_20231227.aprx\FIGURE_X_SITE_LOCATION_MAP_20231227, REVISED: 07/10/2024, SCALE: 1:24,000 when printed at 8.5x11

Attachment B

Plot Plan



EMERGENCY NOTIFICATIONS

TRANSCANADA MONITORING CENTER
1–800–835–7191 OR 304–357–2008

NATIONAL EMERGENCY RESPONSE CENTER
1–800–424–8802

WEST VIRGINIA DEP
1–800–642–3074

KANAWHA COUNTY EMERGENCY MANAGEMENT AGENCY
304–357–0966

FIRE AND OTHER EMERGENCY SERVICES
911

REFERENCE DRAWINGS	
DRAWING No	TITLE

REVISION			APPROVAL						
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
	DATE

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TransCanada
In business to deliver

ELK RIVER COMPRESSOR STATION

FIA # | CHAINAGE: | DISCIPLINE #

PLOT PLAN – SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC)

SCALE | DRAWING No FD–C200–SPCC | REV 00

PLOTTED SIZE: ARCH D (24x36)

ID

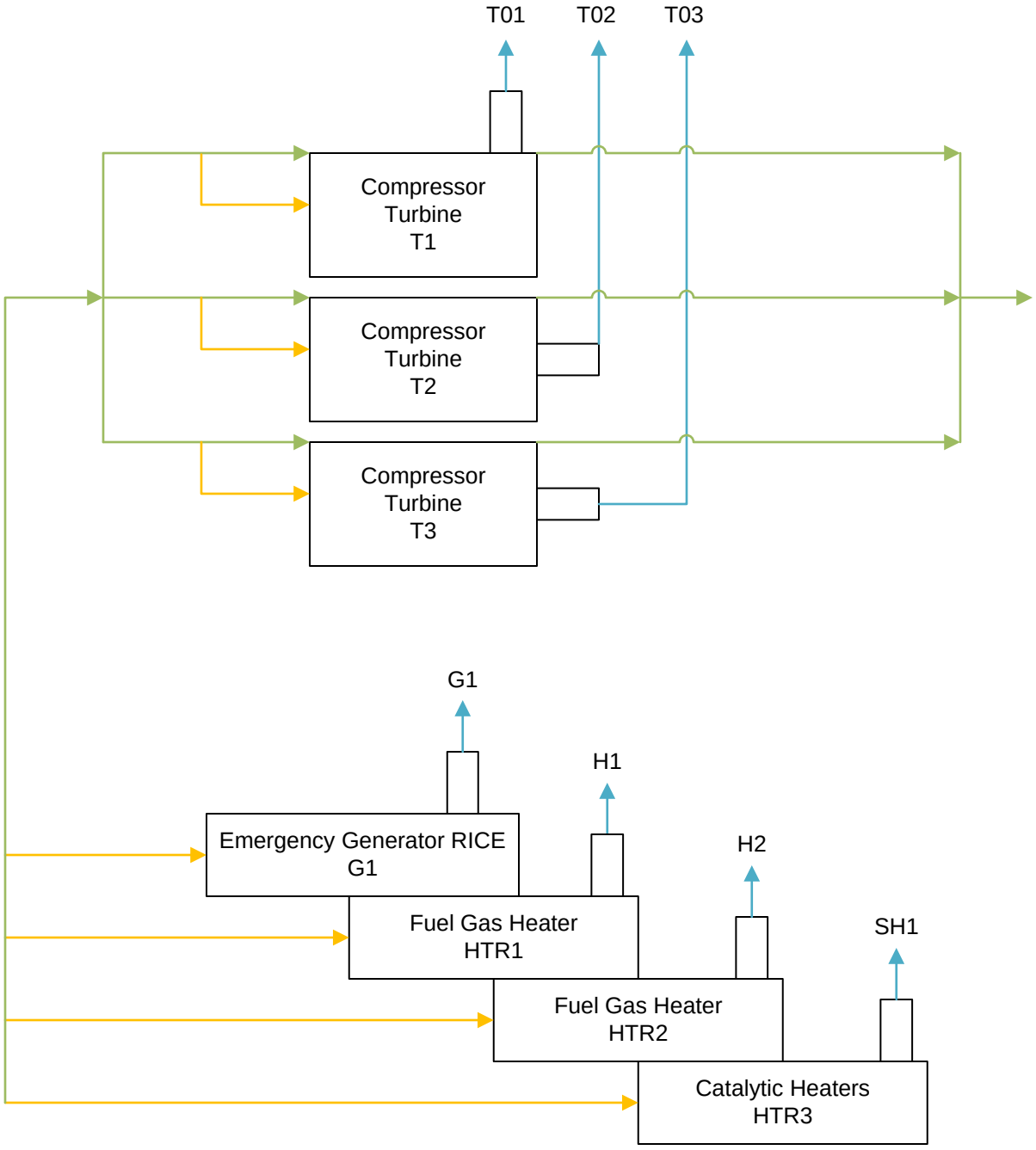
TC_UD_BR_24x36.DWG 24X36

TIME
DESIGNFILE

Attachment C

Process Flow Diagram

ATTACHMENT C
ELK RIVER COMPRESSOR STATION PROCESS FLOW DIAGRAM



Transmission Gas Stream

Fuel Gas

Emission Stream

TC Energy

Attachment D

Equipment Table

ATTACHMENT D - Title V Equipment Table

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

Emission Unit ID[1]	Emission Point ID[1]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device[1]
T1	T01	Turbine Compressor Engine Solar Mars 100	2018	15,600 HP @ 32°F	dry-low-NO_X ($SoLoNO_X$)
T2	T02	Turbine Compressor Engine Solar Mars 100	2018	15,600 HP @ 32°F	dry-low-NO_X ($SoLoNO_X$)
T3	T03	Turbine Compressor Engine Solar Mars 100	2018	15,600 HP @ 32°F	dry-low-NO_X ($SoLoNO_X$)
G1	G1	Emergency Generator RICE Waukesha VGF-L36GL	2018	880 HP	None
HTR1	H1	Fuel Gas Heater	2018	0.50 MMBtu/hr	None
HTR2	H2	Fuel Gas Heater	2018	0.25 MMBtu/hr	None
HTR3	SH1	Catalytic Heaters	2018	2.404 MMBtu/hr	None

[1]For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S,... or other appropriate description for emission units; 1C, 2C, 3C,... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

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, T3	Turbine #1 Turbine #2 Turbine #3	dry-low-NO_X (SoLoNO_X)

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 Turbine #1

Natural gas-fired Solar Mars 100 Turbine #2

Natural gas-fired Solar Mars 100 Turbine #3

Manufacturer:	**Model number:**	**Serial number:**
Solar	Mars 100	

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

15,600 HP @ 32°F

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
130,675 scf/hr (based on 32°F)	1,145 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: 133.29 MMBtu/hr (HHV, 32°F) 15,600 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: 130,675 scf/hr; 1,145 MMscf/yr (based on 32°F)

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)	7.31	80.63
Nitrogen Oxides (NO_X)	7.21	32.39
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.88	3.85
Particulate Matter (PM_{10})	0.88	3.85
Total Particulate Matter (TSP)	0.88	3.85
Sulfur Dioxide (SO_2)	7.61	0.42
Volatile Organic Compounds (VOC)	0.84	4.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.14	0.60
Formaldehyde	0.09	0.41
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	14,060.33	61,584.23

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)

SO_2: 0.20 grains S/100 scf (hourly); 0.25 grains 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) R13-3294C Condition 5.1.1: The Solar turbines (T1, T2, and T3) 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.

(2) R13-3294C Condition 5.1.2: Annual emission limits (tpy): NO_X – 32.29, CO – 80.63, VOC – 4.19, SO_2 – 0.42, PM_{10} – 3.85, CH_2O – 0.41.

(3) R13-3294C Condition 5.1.3: Comply with maximum hourly emission limits for each operating parameter.

(4) R13-3294C Condition 5.1.4: 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) R13-3294C Condition 5.1.5: SO_2 limited to 0.060 lb of SO_2/MMBTU heat input. For 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. [40 CFR §60.4330(a)(2)]

(6) R13-3294C Condition 5.1.6: The permittee must operate and maintain the stationary combustion turbines (T1, T2, and T3) in a manner consistent with good air pollution control practices for minimizing emissions at all times [40 CFR §60.4333(a) and 60.4365(a)]

(7) R13-3294C Condition 5.1.7: Start-up/shutdowns are limited to 200 events per year.

(8) R13-3294C Condition 5.1.8: Each turbine T1, T2, or T3 shall only be fired with pipeline-quality natural gas.

☐ 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) R13-3294C Condition 5.2.1: For the purpose of determining compliance with the annual limits for each combustion turbine (T1, T2, and T3), the permittee shall monitor and record the following for each calendar month: hours the turbine operated at normal conditions (turbine at or above 50% load and the ambient temperature is above 0°F), low-load conditions (turbine load is less than 50% load), low temperature conditions (ambient temperature is less than 0°F but at or above -20°F), and very low temperature conditions (ambient temperature is less than -20°F). Maintain these records in accordance with Condition 3.4.1.

(2) R13-3294C Condition 5.3.1: For the purposes of demonstrating compliance with the NO_X emission standards in permit conditions 5.1.3. and 40 CFR §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 tests) unless the previous results demonstrate that the affected units achieved compliance of less than or equal to 75% 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 40 CFR §60.4340(a). If the results of any subsequent performance test exceed 75% 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 40 CFR §60.4400. Records of such testing will be maintained in accordance with Condition 3.4.1.

(3) R13-3294C Condition 5.3.2: In order to show compliance with the CO emission limits contained in 5.1.2. – 5.1.3. 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).

(4) R13-3294C Condition 5.4.1: To demonstrate compliance with sections 5.1.2. – 5.1.3., the permittee shall maintain records of the amount of natural gas consumed and the hours of operation of each of the Solar turbines (T1, T2, and T3.)

(5) R13-3294C Condition 5.4.2: 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. [40 CFR §60.4365(a)]

(6) R13-3294C Condition 5.4.3: In order to demonstrate compliance with the emission limitations of condition 5.1.2. - 5.1.3. of this permit the permittee will monitor and record the monthly operating hours for each operating parameter listed in permit conditions 5.1.3. 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.

(7) R13-3294C Condition 5.4.4: The number and dates of the startup/shutdown cycles shall be recorded to help demonstrate compliance with 5.1.7.

(8) R13-3294C Condition 5.5.1: The permittee shall submit a notification to the Director of the initial start-up of turbines. Such notice must be submitted within 15 days after the actual date of start-up for the affected source. This notification supersedes the notification requirements of Condition 2.1.8. [40 CFR §60.7(a)(3)].

(9) R13-3294C Condition 5.5.2: The permittee shall submit a written report of the results of testing required in 5.3. 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. [40 CFR §60.4375(b)]

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-L36GL Emergency Generator RICE

Manufacturer:	**Model number:**	**Serial number:**
Waukesha	VGF-L36GL	

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

880 HP

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
6,692 scf/hr	3.35 MMscf/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: 6.83 MMBtu/hr 880 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: 6,692 scf/hr; 3.35 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)	2.52	0.63
Nitrogen Oxides (NO_X)	3.87	0.97
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)	0.39	<0.01
Volatile Organic Compounds (VOC)	0.47	0.12
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.45	0.11
Formaldehyde	0.36	0.09
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	799.32	199.83

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, CO, and VOC: Vendor Data

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

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

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

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) R13-3294C Condition 6.1.1: Operating hours limited to 500 hours/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.

(2) R13-3294C Condition 6.1.2: Maximum emissions from the 880 hp natural gas fired reciprocating engine, Waukesha VGF-L36GL (G1) shall not exceed 3.88 lb/hr or 0.97 ton/year for Nitrogen Oxides, 2.52 lb/hr or 0.63 ton/year for Carbon Monoxide, and 0.47 lb/hr or 0.12 ton/year for Volatile Organic Compounds.

(3) R13-3294C Condition 6.1.3: The emergency generator RICE shall only be fired with pipeline-quality natural gas.

(4) R13-3294C Condition 6.2.1: NO_X emissions shall not exceed 2.0 g/hp-hr or 160 ppmvd at 15% O_2. CO emissions shall not exceed 4.0 g/hp-hr or 540 ppmvd at 15% O_2. VOC emissions shall not exceed 1.0 g/hp-hr or 86 ppmvd at 15% O_2. Emission of formaldehyde shall be excluded when determining compliance with this VOC limit. [40 CFR §60.4233e, Table 1]

(5) R13-3294C Condition 6.2.2: Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine. [40 CFR §60.4245(b)]

☐ 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) R13-3294C Condition 6.3.1: The permittee shall keep records of the hours of operation for the RICE identified as G1. The records must document how many hours are spent for emergency operation, including what classified the operation as an emergency, and how many hours spent for non-emergency operation with corresponding reason for the non—emergency operation. Such records shall be maintained in accordance with Condition 3.4.1. and must be in a manner to demonstrate compliance with the operating limits of Condition 4.1.3.c. [40 CFR §60.4245(b)]

(2) R13-3294C Condition 6.4.1: 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. [40 CFR §60.4237(a)]

(3) R13-3294C Condition 6.5.1: If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in §60.4233(d) or (e), you must demonstrate compliance accord to one of the methods specified in paragraphs (b)(1) and (2) of 40 CFR §60.4243. [40 CFR §60.4243(b)]

(4) R13-3294C Condition 6.5.2: If you own or operate an emergency stationary ICE, you must operate the emergency stationary ICE according to their requirements in paragraphs (d)(1) through (3) of 40 CFR §60.4243. In order for the engine to be considered an emergency stationary ICE under 40 CFR 60 subpart JJJJ, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (d)(1) through (3) of 40 CFR 60.4243, is prohibited. If you do not operate the engine according to the requirements in paragraphs (d)(1) through (3) of 40 CFR §60.4243, the engine will not be considered an emergency engine under 40 CFR 60 subpart JJJJ and must meet all requirements for non-emergency engines. [40 CFR §60.4243(d)]

(5) R13-3294C Condition 6.5.3: Owners and operators of stationary SSI 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 §60.4233. [40 CFR §60.4243(e)]

(6) R13-3294C Condition 6.6.1: owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of 40 CFR §60.4244.

(7) R13-3294C Condition 6.7.1: Owners or operators of stationary SI ICE must meet the following notification, reporting and recordkeeping requirements.

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	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 #1

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

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

0.50 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
490.2 scf/hr	4.29 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: Max Heat Input: 0.50 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: 490.2 scf/hr; 4.29 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)	0.04	0.18
Nitrogen Oxides (NO_X)	0.05	0.21
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)	0.03	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.01
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	58.55	256.44

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)

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

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

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) R13-3294C Condition 7.1.1: The Maximum Design Heat Input (MDHI) shall not exceed 0.50-MMBtu/hr for HTR1 – Fuel Gas Heater, 0.25-MMBtu/hr for HTR2 – Fuel Gas Heater, or 2.404-MMBtu/hr Total for HTR3 – Flameless Catalytic Heaters.

(2) R13-3294C 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]

(3) R13-3294C Condition 7.1.3: The heaters shall only be fired with pipeline-quality natural gas.

☐ 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) R13-3294C Condition 7.2.1: When requested, conduct Method 9 emission observations in accordance with 40 CFR 60 Appendix A.

(2) R13-3294C Conditions 7.3.1: Upon request by the Secretary, compliance with the visible emission requirements of permit condition 7.1.2. shall be determined in accordance with 40 CFR Part 60, 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 7.1.2. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control. [45 CSR §2-3.2.]

(3) R13-3294C Condition 7.4.1: Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40 CFR 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any 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	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 #2

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

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

0.25 MMBtu/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
245.1 scf/hr	2.15 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: Max Heat Input: 0.25 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: 245.1 scf/hr; 2.15 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)	0.02	0.09
Nitrogen Oxides (NO_X)	0.02	0.11
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)	0.01	<0.01
Volatile Organic Compounds (VOC)	<0.01	0.01
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	29.27	128.22

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)

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

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

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) R13-3294C Condition 7.1.1: The Maximum Design Heat Input (MDHI) shall not exceed 0.50-MMBtu/hr for HTR1 – Fuel Gas Heater, 0.25-MMBtu/hr for HTR2 – Fuel Gas Heater, or an estmiated 2.404-MMBtu/hr Total for HTR3 – Flameless Catalytic Heaters.

(2) R13-3294C 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]

(3) R13-3294C Condition 7.1.3: The heaters shall only be fired with pipeline-quality natural gas.

☐ 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) R13-3294C Condition 7.2.1: When requested, conduct Method 9 emission observations in accordance with 40 CFR 60 Appendix A.

(2) R13-3294C Conditions 7.3.1: Upon request by the Secretary, compliance with the visible emission requirements of permit condition 7.1.2. shall be determined in accordance with 40 CFR Part 60, 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 7.1.2. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control. [45 CSR §2-3.2.]

(3) R13-3294C Condition 7.4.1: Any deviation(s) from the allowable visible emission requirement for any emission source discovered during observations using 40 CFR 60, Appendix A, Method 9 or 22 shall be reported in writing to the Director of the Division of Air Quality as soon as practicable, but in any case within ten (10) calendar days of the occurrence and shall include at least the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any 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):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

2.404 MMBtu/hr (Total)

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
2,356.9 scf/hr	20.65 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: 2.404 MMBtu/hr (total)	**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: 2,356.9 scf/hr; 20.65 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)	0.20	0.87
Nitrogen Oxides (NO_X)	0.24	1.03
Lead (Pb)	-	-
Particulate Matter ($PM_{2.5}$)	0.01	0.06
Particulate Matter (PM_{10})	0.01	0.06
Total Particulate Matter (TSP)	0.01	0.06
Sulfur Dioxide (SO_2)	0.14	<0.01
Volatile Organic Compounds (VOC)	0.01	0.06
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	281.50	1,232.98

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)

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

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

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) R13-3294C Condition 7.1.1: The Maximum Design Heat Input (MDHI) shall not exceed 0.50-MMBtu/hr for HTR1 – Fuel Gas Heater, 0.25-MMBtu/hr for HTR2 – Fuel Gas Heater, or an estimated 2.404-MMBtu/hr Total for HTR3 – Flameless Catalytic Heaters.

(2) R13-3294C Condition 7.1.3: The heaters shall only be fired with pipeline-quality natural gas.

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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:**
TK01	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:**
N/A	N/A	N/A

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (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 per year)	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	0.00	<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.).

Tank emissions rates were calculated using Emission Master software.

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:**
TK02	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)

10,000-gallon pipeline liquids storage tank

Manufacturer:	**Model number:**	**Serial number:**
N/A	N/A	N/A

Construction date:	**Installation date:**	**Modification date(s):**
09/25/2018 (In service)	09/25/2018 (In service)	N/A

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

10,000 gal

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	12,000 gal (12 turnovers per year)	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)	0.20	0.85
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	5.17	22.63

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.).

Tank emission rates were calculated using Promax software.

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
Elk River Compressor Station
Title V Permit Application - October 2024
Facility Total PTE

Source	Annual Emissions (tpy)															
	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 Mars 100 Turbine	0.84	4.19	0.14	0.60	7.21	32.29	7.31	80.63	0.88	3.85	7.61	0.42	0.26	1.16	14,060.25	61,583.88
T02 - Solar Mars 100 Turbine	0.84	4.19	0.14	0.60	7.21	32.29	7.31	80.63	0.88	3.85	7.61	0.42	0.26	1.16	14,060.25	61,583.88
T03 - Solar Mars 100 Turbine	0.84	4.19	0.14	0.60	7.21	32.29	7.31	80.63	0.88	3.85	7.61	0.42	0.26	1.16	14,060.25	61,583.88
G1 - Waukesha Emergency Generator RICE	0.47	0.12	0.45	0.11	3.87	0.97	2.52	0.63	<0.01	<0.01	0.39	<0.01	0.02	<0.01	799.32	199.83
H1 - Fuel Gas Heater	<0.01	0.01	<0.01	<0.01	0.05	0.21	0.04	0.18	<0.01	0.02	0.03	<0.01	<0.01	<0.01	58.55	256.44
H2 - Fuel Gas Heater	<0.01	0.01	<0.01	<0.01	0.05	0.21	0.04	0.18	<0.01	0.02	0.03	<0.01	<0.01	<0.01	58.55	256.44
SH1 - Catalytic Heaters	0.01	0.06	<0.01	0.02	0.24	1.03	0.20	0.87	0.02	0.08	0.14	<0.01	<0.01	0.02	281.50	1,232.98
A05 - Wastewater Tank	<0.01	<0.01	<0.01	<0.01									<0.01	<0.01	<0.01	<0.01
A01 - A04 - Pipeline Liquids Tanks	0.20	0.85	<0.01	<0.01									0.18	0.81	5.17	22.63
Equipment Leaks (fugitive emissions)	0.60	2.63	<0.01	0.03									22.23	97.36	622.49	2,726.52
Compressor Venting	4.96	21.75	0.05	0.24									183.55	803.96	5,140.37	22,514.84
Blowdowns	1.62	7.11	0.02	0.08									59.98	262.72	1,679.80	7,357.54
Proposed PTE[1]	9.78	42.48	0.94	2.24	25.84	99.30	24.73	243.74	2.67	11.67	23.42	1.26	244.54	1,071.01	50,204.01	216,592.35

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
Elk River Compressor Station
Title V Permit Application - October 2024
Facility Total HAPs Emissions

Source	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 Mars 100 Turbine	0.14	0.60	<0.01	<0.01	0.09	0.41	<0.01	<0.01	<0.01	<0.01	0.02	0.07	<0.01	0.02	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
T02 - Solar Mars 100 Turbine	0.14	0.60	<0.01	<0.01	0.09	0.41	<0.01	<0.01	<0.01	<0.01	0.02	0.07	<0.01	0.02	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
T03 - Solar Mars 100 Turbine	0.14	0.60	<0.01	<0.01	0.09	0.41	<0.01	<0.01	<0.01	<0.01	0.02	0.07	<0.01	0.02	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
G1 - Waukesha Emergency Generator RICE	0.45	0.11	0.02	<0.01	0.36	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	0.04	<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	<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
H2 - Fuel Gas Heater	<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	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SH1 - 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	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
A05 - 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						
A01 - A04 - 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	<0.01	<0.01						
Equipment Leaks (fugitive emissions)	<0.01	0.03																						
Compressor Venting	0.05	0.24																						
Blowdowns	0.02	0.08																						
Proposed PTE[1]	0.94	2.24	0.02	<0.01	0.62	1.33	<0.01	<0.01	<0.01	0.02	0.05	0.21	0.01	0.05	0.02	0.10	<0.01	<0.01	0.07	0.08	0.04	0.02	<0.01	<0.01

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
Elk River Compressor Station
Title V Permit Application - October 2024
Insignificant Sources Emissions

Elk River Compressor Station - Insignificant Sources

Emission Sources	VOCs		HAPs	
	lb/hr	ton/year	lb/hr	ton/year
Wastewater Tank A05	<0.01	<0.01	<0.01	<0.01
Pipeline Liquids Tanks A01	0.05	0.21	<0.01	<0.01
Pipeline Liquids Tanks A02	0.05	0.21	<0.01	<0.01
Pipeline Liquids Tanks A03	0.05	0.21	<0.01	<0.01
Pipeline Liquids Tanks A04	0.05	0.21	<0.01	<0.01
Totals	**0.20**	**0.85**	**<0.01**	**<0.01**

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Solar Mars 100 Turbine (T01 - T03)

Horsepower	15,600	HP	
Brake Specific Fuel Consumption	7,697	Btu/Bhp-hr	(LHV, 32°F)
Total Heat Input	120.08	MMBtu/hr	(LHV, 32°F)
Maximum Heat Input	133.29	MMBtu/hr	
Operating Hours	8760	hr/yr	
Natural Gas Heat Content	1020	Btu/scf	
Fuel Consumption	1144.72	MMscf/yr	
	130,675.3	scf/hr (based on maximum horsepower)	
Quantity	3		

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	lb/bhp-hr	lb/MMBtu		lb/hr	ton/yr	
NO_x	4.16E-04	5.41E-02	HHV	7.21	32.29	Vendor Data
CO	4.22E-04	5.48E-02	HHV	7.31	80.63	Vendor Data
PM_{10}	5.64E-05	7.33E-03		0.88	3.85	Vendor Data
$PM_{2.5}$	5.64E-05	7.33E-03		0.88	3.85	Vendor Data
VOC	5.93E-05	7.70E-03	HHV	0.84	4.19	Vendor Data
SO_2 (Maximum Hourly)	4.39E-04	5.71E-02	HHV	7.61		20 grains S / 100 scf
SO_2 (Average Annual)	5.50E-06	7.14E-04	HHV		0.42	0.25 grains S / 100 scf
CO_2	0.90	116.98		14,045.82	61,520.69	40 CFR Subpart C
CH_4	1.70E-05	2.20E-03		0.26	1.16	40 CFR Subpart C
N_2O	1.70E-06	2.20E-04		0.03	0.12	40 CFR Subpart C
Benzene	9.24E-08	1.20E-05	HHV	<0.01	<0.01	AP-42 Table 3.1-3 (4/00)
Toluene	1.00E-06	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	4.93E-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	1.00E-08	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	4.93E-07	6.40E-05		<0.01	0.03	AP-42 Table 3.1-3 (4/00)
CO_2e			117.1	14,060.25	61,583.88	40 CFR 98 Subpart C
Total HAPs			0.00102	0.14	0.60	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
Elk River Compressor Station
Title V Permit Application - October 2024
Emissions from Venting - Solar Mars 100 (T01, T02, & T03)

Number of Pneumatic Actuators:	7	per turbine
Pneumatic Actuator Vent Rate:	3	scf/hr/actuator
Number of Startup/Shutdown Cycles:	200	per turbine per year
Electric Starter Emissions per Startup:	0	scf
Blowdown Emissions per Shutdown:	67,126	scf
Number of Turbines	3	
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)	63.00	56.44	0.10	2.39	0.01	10.46	0.05	293.02	0.28	0.00
Dry Seals (Total for number of units)	180.00	161.25	0.29	6.83	0.03	29.90	0.15	837.21	0.81	0.01
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]	201,378.00	180,398.36	321.12	7,636.03	37.24	763.60	3.72	21,384.60	20.65	0.22
							Total:	22,514.84	21.75	0.24

Notes:
1. Emission rates per event instead of per hour.
2. CH_4 and CO_2 emission rates based on 89.58 vol% CH_4 and 0.16 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.
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 0.027 ratio of VOC to methane as calculated from gas composition.
6. Based on a 0.00029 ratio of HAPs to methane as calculated from gas composition.

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Solar Mars 100 (T01, T02, & T03) - Emission Rates

Emission Rates per Operating Mode

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	7.21	7.31	0.84
Low Temp (<0 °F)[2]	lb/hr	21.91	31.75	1.81
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	30.93	31.36	3.60
Low Temp (<0 °F)		48	0.53	0.76	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	32.29	80.63	4.19

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, T03 / 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
Elk River Compressor Station
Title V Permit Application - October 2024
Waukesha VGF-L63GL Emergency Generator (G1)

Horsepower	880	hp
Brake Specific Fuel Consumption	7,757	Btu/Bhp-hr
Total Heat Input	6.83	MMBtu/hr
Operating Hours	500	hr/yr
Natural Gas Heat Content	1,020	Btu/scf
Fuel Consumption	3.35	MMscf/yr
	6,692	scf/hr
Quantity	1	

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO_x	3.41E-05	4.40E-03	3.87	0.97	Vendor Data
CO	2.22E-05	2.86E-03	2.52	0.63	Vendor Data
PM_{10}	7.71E-05	5.98E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
$PM_{2.5}$	7.71E-05	5.98E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
VOC	4.10E-06	5.29E-04	0.47	0.12	Vendor Data
SO_2 (Maximum Hourly)	0.0571	4.43E-04	0.39		20 grains S / 100 scf
SO_2 (Average Annual)	0.000714	5.54E-06		<0.01	0.25 grains S / 100 scf
CO_2	116.977	9.07E-01	798.50	199.63	40 CFR Subpart C
CH_4	0.002205	1.71E-05	0.02	<0.01	40 CFR Subpart C
N_2O	0.000220	1.71E-06	<0.01	<0.01	40 CFR Subpart C
Methanol	0.002500	1.94E-05	0.02	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
n-Hexane	0.001110	8.61E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Benzene	0.000440	3.41E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Toluene	0.000408	3.16E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Ethylbenzene	0.000040	3.08E-07	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Acetaldehyde	0.008360	6.48E-05	0.06	0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
2,2,4-Trimethylpentane	0.000250	1.94E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Xylene	0.000184	1.43E-06	<0.01	<0.01	AP-42 Table 3.2-2 (10/24) - 4SLB
Formaldehyde	0.05280	4.10E-04	0.36	0.09	AP-42 Table 3.2-2 (10/24) - 4SLB
CO_2e	117.1		799.32	199.83	40 CFR 98 Subpart C
Total HAPs	0.066		0.45	0.11	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
Elk River Compressor Station
Title V Permit Application - October 2024
Fuel Gas Heater (H1)

Heat Input	0.50	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	4.29	MMscf/yr
	490.2	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	0.05	0.21	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.04	0.18	AP-42 Table 1.4-1 (7/98)
PM_{10}	7.6	0.007	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	<0.01	0.02	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	0.01	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.03		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	58.49	256.18	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	58.55	256.44	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
Elk River Compressor Station
Title V Permit Application - October 2024
Fuel Gas Heater (H2)

Heat Input	0.25	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	2.15	MMscf/yr
	245.1	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	0.02	0.11	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.02	0.09	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	<0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	<0.01	<0.01	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.01		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	29.24	128.09	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	29.27	128.22	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
Elk River Compressor Station
Title V Permit Application - October 2024
Catalytic Heaters (SH1)

Heat Input	2.404	MMBtu/hr (total)
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	20.65	MMscf/yr
	2356.9	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.24	1.03	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.20	0.87	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	0.01	0.06	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.01	0.06	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.14		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		<0.01	0.25 grains S / 100 scf
CO_2		116.977137	281.21	1,231.71	40 CFR Subpart C
CH_4		0.002205	<0.01	0.02	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	281.50	1,232.98	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 January 2025). GWP CO_2=1, GWP CH_4=28, GWP N_2O=265

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05
Insignificant Source

Air Contaminant	Emission Rates	
	Hourly	Annual
	(lb/hr)	(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 calculated using Emission Master software. Emission Master calculations are attached.
- Emission profiles shown above are for one (1) 1,000 gallon Condensate Tank with 12 Turnovers per year.

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Pipeline Liquids Tanks A01 - A04
Insignificant Source

Air Contaminant	Emission Rates	
	Hourly	Annual
	(lb/hr)	(tpy)
VOCs	0.20	0.85
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	0.18	0.81
CO_2	<0.01	0.01
CO_2e	5.17	22.63

Notes:
- Tank emission rates were calculated using Promax software. Promax output emissions are attached.
- Emission profiles shown above are for four 2,500 gallon Condensate Tanks with 12 Turnovers per year.

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Fugitive Emissions from Leaks
Number of Compressors: 3

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	163	4	9.6	336,384.00	301,339.38	536.40	6.38	0.03	178.61	0.17	<0.01
Connector	595	12	4.9	515,088.00	461,425.93	821.36	9.77	0.05	273.49	0.26	<0.01
Flange	79	2	6.9	120,888.00	108,293.84	192.77	2.29	0.01	64.19	0.06	<0.01
Pressure Relief Valve	3	1	7.8	68,328.00	61,209.56	108.96	1.30	<0.01	36.28	0.04	<0.01
Meter	0	0	9.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Non-Compressor Service											
Valve	634	13	9.6	1,093,248.00	979,352.99	1,743.29	20.73	0.10	580.47	0.56	<0.01
Connector	1465	30	4.9	1,287,720.00	1,153,564.82	2,053.39	24.41	0.12	683.72	0.66	<0.01
Flange	304	7	6.9	1,269,324.00	1,137,085.32	2,024.06	24.07	0.12	673.96	0.65	<0.01
Pressure Relief Valve	12	1	7.8	204,984.00	183,628.68	326.87	3.89	0.02	108.84	0.11	<0.01
Meter	6	1	9.1	239,148.00	214,233.47	381.34	4.53	0.02	126.98	0.12	<0.01
						Total:	97.36	0.47	2,726.52	2.63	0.03

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 89.58 vol% CH_4 and 0.16 vol% CO_2 in Elk River 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 0.027 mol ratio of VOC to methane as calculated from Elk River gas composition data.
8. Based on a 0.00029 ratio of HAPs to methane as calculated from Elk River gas composition data.

Columbia Gas Transmission, LLC
Elk River 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	177.56	0.87	4,972.59	4.80	0.05
Pigging Blowdowns	6.97	0.03	195.29	0.19	<0.01
Station Emergency Shutdown	78.19	0.38	2,189.67	2.11	0.02
Blowdown, Total	262.72	1.28	7,357.54	7.11	0.08

Notes:
1. CH_4 emission rates based on 89.58 vol% CH_4 in annualized Elk River natural gas data
2. Based on a 0.027 mol ratio of VOC to methane as calculated from Elk River gas composition data
3. Based on a 0.00029 ratio of HAPs to methane as calculated from Elk River gas composition data

Elk River Facility Wide Emergency Shutdown (ESD) PTE Emission Calculations
Blowdown Emissions per Event (mscf/event): 2,062.0
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	4,124.0	3,694.36	6.58	78.19	0.38	2,189.67	2.11	0.023

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 Elk River 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 1-3	150	59.2	8,885	7,959	14.17	168.45	0.82	4,717.29	4.56	0.05
Filter Separators A-D	12	17.7	213	190	0.34	4.03	0.02	112.90	0.11	<0.01
Slug Catcher A	3	89.4	268	240	0.43	5.08	0.02	142.40	0.14	<0.01
Slug Catcher B	3	47.5	143	128	0.23	2.70	0.01	75.69	0.07	<0.01
Total	--	--	9,365	8,390	14.93	177.56	0.87	4,972.59	4.80	0.05

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)
L&R WB	12	13.4		0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
L&R WB5	12	12.8	154	138	0.25	2.92	0.01	81.75	0.08	<0.01
L&R WB22	12	17.8	214	192	0.34	4.05	0.02	113.54	0.11	<0.01
L&R X52	12	11.7	141	126	0.22	2.67	0.01	74.67	0.07	<0.01
Total	--	--	368	329	0.59	6.97	0.03	195.29	0.19	<0.01

Columbia Gas Transmission, LLC
Elk River 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	0.42	28.01	0.1176	0.6655
Carbon Dioxide	0.16	44.01	0.0702	0.3973
Methane	89.58	16.04	14.3716	81.3570
Ethane	9.05	30.07	2.7204	15.4001
Propane	0.60	44.10	0.2648	1.4988
iso-Butane	0.06	58.12	0.0323	0.1828
n-Butane	0.08	58.12	0.0450	0.2546
iso-Pentane	0.02	72.15	0.0147	0.0835
n-Pentane	0.01	72.15	0.0092	0.0520
C_{6+} Components	0.02	89.09	0.0192	0.1084
Total	100.00	-	17.66	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	2.39E-04	114.23	2.73E-04	1.54E-03
Benzene	2.60E-04	78.11	2.03E-04	1.15E-03
Ethylbenzene	1.08E-05	106.17	1.14E-05	6.46E-05
n-Hexane	4.05E-03	86.18	3.49E-03	1.98E-02
Toluene	1.74E-04	92.14	1.60E-04	9.08E-04
Xylenes	8.60E-05	106.17	9.13E-05	5.17E-04
Total HAPs	4.82E-03	-	4.23E-03	2.39E-02

Totals	Mol %	Weight %
Total VOCs	0.79	2.20
Total HAPs	4.82E-03	2.39E-02

Ratios	Mol	Weight
VOC/Methane Ratio	8.80E-03	2.70E-02
HAPs/Methane Ratio	5.38E-05	2.94E-04

Mass Fraction Conversion Data

Compound	Mol Weight (g/mol)	Mass in Gas Sample (g)		Mass %
CO_2	44.01	7.02	0.0040	0.3973
N_2	28.02	11.76	0.0067	0.6656
Methane	16.04	1436.89	0.8134	81.3377
Ethane	30.07	272.04	0.1540	15.3993
Propane	44.09	26.47	0.0150	1.4985
I-Butane	58.12	3.23	0.0018	0.1828
N-Butane	58.12	4.50	0.0025	0.2546
I-Pentane	72.15	1.47	0.0008	0.0835
N-Pentane	72.15	0.92	0.0005	0.0520
Other hexanes	86.18	1.85	0.0010	0.1049
n-hexane	86.18	0.35	0.0002	0.0197
2,2,4 - Trimethylpentane	114.23	0.03	0.0000	0.0015
Benzene	78.11	0.02	0.0000	0.0012
Toluene	92.14	0.02	0.0000	0.0009
Ethylbenzene	106.17	0.001	0.0000	0.0001
Xylenes	106.17	0.01	0.0000	0.0005

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
Elk River Compressor Station
Title V Permit Application - September 2024
Wastewater Tank A05 - Insignificant Source
EmissionMaster 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)

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05 - 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
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05 - 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)

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05 - 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 A05	Horizontal Storage	6.9824	3.4912	N/A	N/A	1000	1000	Normal	-0.03	0.03	0.25

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05 - 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 A05	Compound	Mineral Oil (White)	composition link	66.8856	0.001633333	0.037708333	0.993166667	0

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A0 - 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 A05	57.10931667	194.27	0.04715833	12000	285.7143	1	1	0

Columbia Gas Transmission, LLC
Elk River Compressor Station
Title V Permit Application - October 2024
Wastewater Tank A05 - 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 A05				0.000	0	0.000	0

10,000 gal
Plant Schematic

Client Name:	TC Energy	Job: Condensate Tank Emissions
Location:	Elk River Station	
Flowsheet:	10000 gal	

TC Energy
Elk River Station
TK02 Condensate Tank Emissions