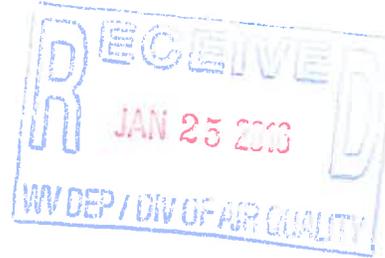


January 15, 2016

Mr. William F. Durham, Director
WVDEP - Division of Air Quality
601 57th Street SE
Charleston, West Virginia 25304



RE: Construction Application (45CSR13)
Columbia Gas Transmission, LLC
Elk River Compressor Station

Dear Mr. Durham,

Attached is an initial application for construction of Columbia Gas Transmission's (Columbia) proposed Elk River Compressor Station, which will be located in Kanawha County, West Virginia. This package contains Columbia's application to install the following equipment:

- Three (3) Solar Mars 100 turbines (15,600 hp each);
- One (1) Waukesha emergency generator (880 hp);
- Two (2) process heaters (0.4 MMbtu/hr and 0.25 MMbtu/hr);
- Forty-nine (49) catalytic heaters; and
- Various small, insignificant tanks.

The Station's potential to emit (PTE) is over 100 tons per year for carbon monoxide; therefore, the Station will be considered a Title V source for permitting purposes. After the construction permit has been approved by WVDEP and the facility is operational, a Title V Operating Permit application will be submitted. The Station's PTE will not exceed Prevention of Significant Deterioration (PSD) applicability thresholds; therefore, the Station will not be considered a major PSD source.

This application package includes all required forms and attachments for a minor NSR construction permit application. A check in the amount of \$2,000 is included for application fees.

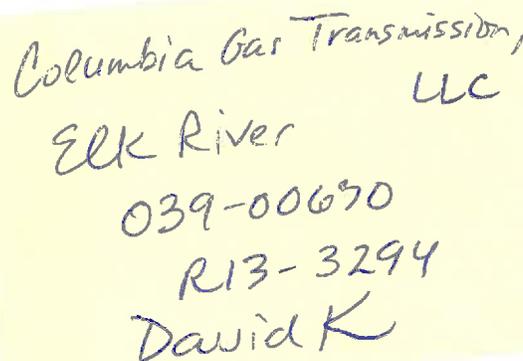
Should you have any questions or need additional information, please feel free to contact me at (337) 241-0686 or via email at livey@cpg.com.

Sincerely,



Lacey A. Livey
Principal Air
Columbia Pipeline Group

Attachments



Columbia Gas Transmission,
Elk River LLC
039-00690
R13-3294
David K

**APPLICATION FOR 45 CSR 13
CONSTRUCTION PERMIT**

**Columbia Gas Transmission, LLC
Elk River Compressor Station
Kanawha County, West Virginia**

January 2016

Table of Contents

- NSR Application Form
- Attachment A: Business Certificate
- Attachment B: Map
- Attachment C: Installation and Start Up Schedule
- Attachment D: Regulatory Discussion
- Attachment E: Plot Plan
- Attachment F: Detailed Process Flow Diagram
- Attachment G: Process Description
- Attachment H: SDSs
- Attachment I: Emission Units Table
- Attachment J: Emission Points Data Summary Sheet
- Attachment K: Fugitive Emissions Data Summary Sheet
- Attachment L: Emissions Unit Data Sheets
- Attachment N: Supporting Emissions Calculations
- Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- Attachment P: Public Notice
- Supplemental Attachment: Emergency Generator Initial Notification



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

601 57th Street, SE
 Charleston, WV 25304
 (304) 926-0475
www.dep.wv.gov/daq

**APPLICATION FOR NSR PERMIT
 AND
 TITLE V PERMIT REVISION
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):

- CONSTRUCTION MODIFICATION RELOCATION
 CLASS I ADMINISTRATIVE UPDATE TEMPORARY
 CLASS II ADMINISTRATIVE UPDATE AFTER-THE-FACT

PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT MINOR MODIFICATION
 SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office): Columbia Gas		2. Federal Employer ID No. (FEIN): 310802435	
3. Name of facility (if different from above): Elk River Compressor Station		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: Columbia Gas Transmission LLC 1700 MacCorkle Ave, SE Charleston, WV 25314		5B. Facility's present physical address: State Route 4 Clendenin, West Virginia 25045	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, provide a copy of the Certificate of Incorporation/Organization/Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A. - If NO, provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: Columbia Pipeline Group, Inc.			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain: Compressor Station will be built within the fenceline of Columbia's existing Cobb Compressor Station, which is a completely electric-powered facility. - If NO, you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): Natural gas compressor station		10. North American Industry Classification System (NAICS) code for the facility: 486210	
11A. DAQ Plant ID No. (for existing facilities only):		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):	

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

<p>12A.</p> <ul style="list-style-type: none"> For Modifications, Administrative Updates or Temporary permits at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; For Construction or Relocation permits, please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a MAP as Attachment B. From the town of Clendenin, travel north/east on Elk River Road/State Route 4. Proceed approximately 1.5 miles. Compressor Station is on the right. 		
<p>12.B. New site address (if applicable): State Route 4 Clendenin, West Virginia 25045</p>	<p>12C. Nearest city or town: Clendenin</p>	<p>12D. County: Kanawha</p>
<p>12.E. UTM Northing (KM): 4,259.9</p>	<p>12F. UTM Easting (KM): 471.8</p>	<p>12G. UTM Zone: 17</p>
<p>13. Briefly describe the proposed change(s) at the facility: Installation of three Solar Mars 100 turbines, one emergency generator, two process heaters, and 49 catalytic heaters.</p>		
<p>14A. Provide the date of anticipated installation or change: 2/1/2017</p> <ul style="list-style-type: none"> If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: / / 		<p>14B. Date of anticipated Start-Up if a permit is granted: 10/1/2017</p>
<p>14C. Provide a Schedule of the planned Installation of/Change to and Start-Up of each of the units proposed in this permit application as Attachment C (if more than one unit is involved).</p>		
<p>15. Provide maximum projected Operating Schedule of activity/activities outlined in this application: Hours Per Day 24 Days Per Week 7 Weeks Per Year 52</p>		
<p>16. Is demolition or physical renovation at an existing facility involved? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>		
<p>17. Risk Management Plans. If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your Risk Management Plan (RMP) to U. S. EPA Region III.</p>		
<p>18. Regulatory Discussion. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<i>if known</i>). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (<i>if known</i>). Provide this information as Attachment D.</p>		

Section II. Additional attachments and supporting documents.

<p>19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).</p>
<p>20. Include a Table of Contents as the first page of your application package.</p>
<p>21. Provide a Plot Plan, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E (Refer to <i>Plot Plan Guidance</i>).</p> <ul style="list-style-type: none"> Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).
<p>22. Provide a Detailed Process Flow Diagram(s) showing each proposed or modified emissions unit, emission point and control device as Attachment F.</p>
<p>23. Provide a Process Description as Attachment G.</p> <ul style="list-style-type: none"> Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).
<p><i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i></p>

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H**.
 – For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I**.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J**.

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K**.

28. Check all applicable **Emissions Unit Data Sheets** listed below:

<input type="checkbox"/> Bulk Liquid Transfer Operations	<input type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry
<input type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities
<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	

General Emission Unit, specify Three natural gas-fired turbines, one emergency generator, two process heaters, 49 catalytic heaters

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L**.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input type="checkbox"/> Flare
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System
<input type="checkbox"/> Other Collectors, specify		

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M**.

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O**.
 ➤ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **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 found in the **General Instructions** as **Attachment Q**.

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

<input type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R**.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned **Responsible Official** / **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

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.

SIGNATURE _____

Steven A. Nelson

(Please use blue ink)

DATE: _____

1-13-2018

(Please use blue ink)

35B. Printed name of signee: Steven A. Nelson

35C. Title: Manager of Operations

35D. E-mail:
snelson@cpg.com

36E. Phone: 304-548-1630

36F. FAX:

36A. Printed name of contact person (if different from above):
Laçey Ivey

36B. Title: Principal Air

36C. E-mail: livey@cpg.com

36D. Phone: 337-241-0686

36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate | <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet |
| <input checked="" type="checkbox"/> Attachment B: Map(s) | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s) |
| <input checked="" type="checkbox"/> Attachment C: Installation and Start Up Schedule | <input type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s) |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s) | <input checked="" type="checkbox"/> Attachment P: Public Notice |
| <input checked="" type="checkbox"/> Attachment G: Process Description | <input type="checkbox"/> Attachment Q: Business Confidential Claims |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input type="checkbox"/> Attachment R: Authority Forms |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table | <input type="checkbox"/> Attachment S: Title V Permit Revision Information |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee |

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- Forward 1 copy of the application to the Title V Permitting Group and:
- For Title V Administrative Amendments:
 NSR permit writer should notify Title V permit writer of draft permit,
- For Title V Minor Modifications:
 Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
 NSR permit writer should notify Title V permit writer of draft permit.
- For Title V Significant Modifications processed in parallel with NSR Permit revision:
 NSR permit writer should notify a Title V permit writer of draft permit,
 Public notice should reference both 45CSR13 and Title V permits,
 EPA has 45 day review period of a draft permit.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Attachment A

Business Certificate

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**COLUMBIA GAS TRANSMISSION LLC
5151 SAN FELIPE ST 2500
HOUSTON, TX 77056-3639**

BUSINESS REGISTRATION ACCOUNT NUMBER: 1025-1555

This certificate is issued on: 07/1/2011

*This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.*

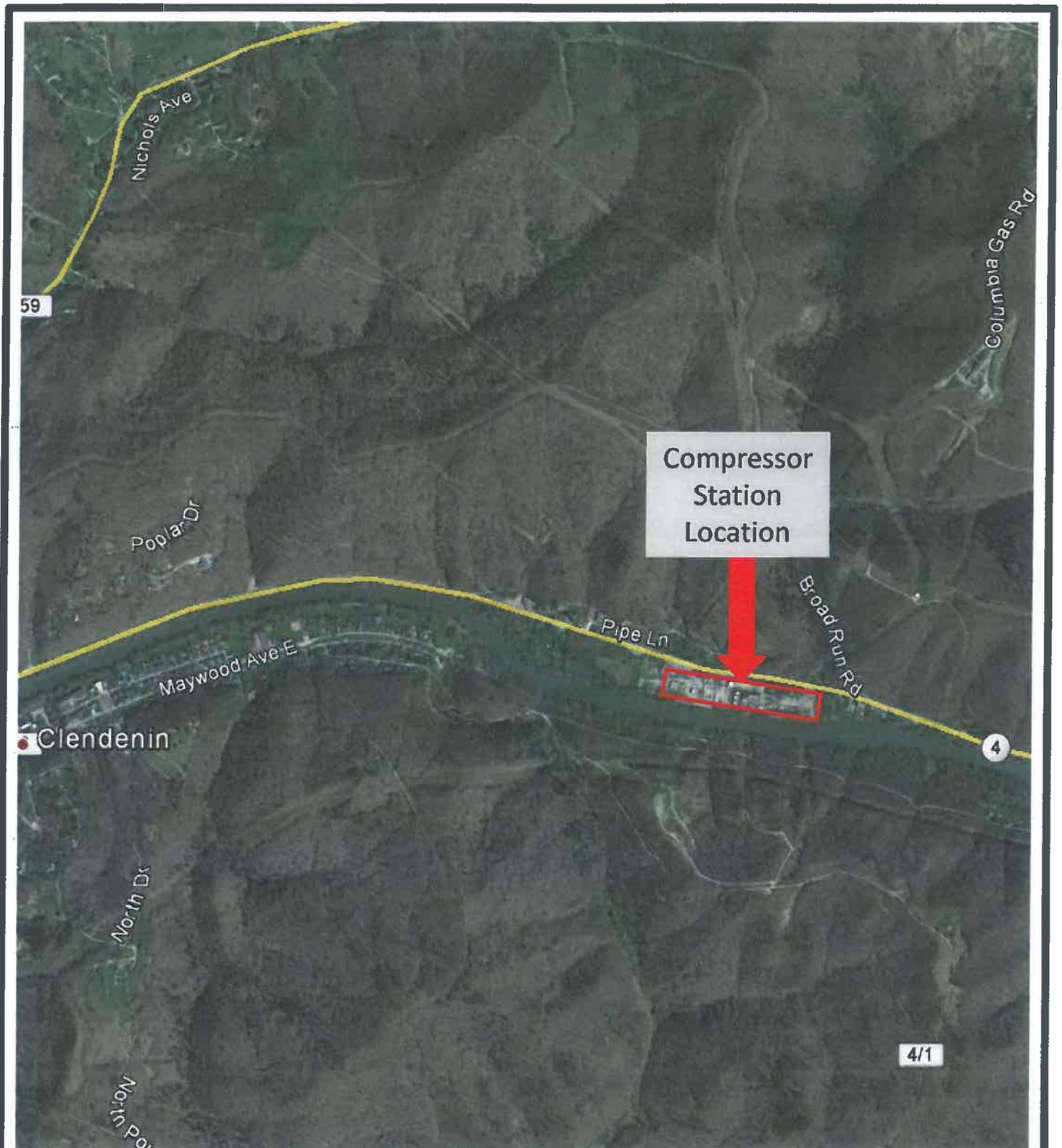
This certificate is not transferrable and must be displayed at the location for which issued.
This certificate shall be permanent until cessation of the business for which the certificate of registration
was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new
certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of
this certificate displayed at every job site within West Virginia.

Attachment B

Map



From the town of Clendenin, travel north/east on Elk River Road/State Route 4. Proceed approximately 1.5 miles. Compressor Station is on the right.

Attachment B

Date: December 2015

Facility Map
Elk River Compressor Station

Attachment C

Installation and Start Up Schedule

Installation and Start Up Schedule

Emission Point	Installation Date	Start Up Date
T01 – Solar Mars 100 Turbine #1	March 2017	May 2018
T02 – Solar Mars 100 Turbine #2	March 2017	May 2018
T03 – Solar Mars 100 Turbine #3	March 2017	May 2018
G1 – Waukesha Em. Generator	March 2017	May 2018
H1 – Process Heater #1	March 2017	May 2018
H2 – Process Heater #2	March 2017	May 2018
SH1 – 49 Catalytic Heaters	March 2017	May 2018

Attachment D

Regulatory Discussion

1.0 INTRODUCTION

1.1 Summary and Conclusions

Columbia Gas Transmission, LLC (Columbia) is proposing to construct the Elk River Compressor Station (the "Station"). Construction of the Elk River Compressor Station (the "Project") is scheduled to begin in February 2017. This application package contains Columbia's application to:

- Install three (3) new Solar Mars 100 turbines (15,600 horsepower [hp] each at 32 °F);
- Install one (1) new emergency generator (880 hp);
- Install two (2) new fuel gas heaters (0.40 million British thermal unit per hour [MMBtu/hr] and 0.25 MMBtu/hr);
- Install forty-nine (49) new catalytic heaters (8 x 0.005 MMBtu/hr, 27 x 0.072 MMBtu/hr, and 14 x 0.03 MMBtu/hr); and
- Install (4) 2500 gallon condensate tanks and (1) 1000 gallon waste water tank.

An analysis of federal and state regulations was performed to identify applicable air quality regulations. Federal and state regulations potentially applying to the proposed Project are summarized in Section 3.

1.2 Report Organization

The proposed Project is described in Section 2.0. An analysis of applicable regulations and proposed compliance procedures is presented in Section 3.0. Completed permit application forms, including emissions estimating basis, emission calculations, and supporting data are contained within this application package.

2.0 PROJECT DESCRIPTION

2.1 Description of Proposed Facility

Columbia's Elk River Compressor Station will be located in Kanawha County, West Virginia, near the town of Clendenin. The Station will receive natural gas via pipeline from an upstream compressor station, compress it using natural gas-fired turbines, and transmit it via pipeline to a downstream station. The Station is covered by Standard Industrial Classification (SIC) 4922 and has the potential to operate seven (7) days per week, twenty-four (24) hours per day.

Columbia is proposing to:

- Install three (3) new Solar Mars 100 turbines (15,600 hp each at 32 °F);
- Install one (1) new 880-hp Waukesha emergency generator;
- Install two (2) new fuel gas heaters rated at 0.40 MMBtu/hr and 0.25 MMBtu/hr;
- Install forty-nine (49) new catalytic heaters (8 x 0.005 MMBtu/hr, 27 x 0.072 MMBtu/hr, and 14 x 0.03 MMBtu/hr); and
- Install (4) 2500 gallon condensate tanks and (1) 1000 gallon waste water tank.

The three proposed Solar Mars 100 turbines each have an output of 15,600 hp at 32 °F. These proposed turbines are designated Emission Point ID T01, T02, and T03. Attachment F includes a process flow diagram showing the proposed turbines. The U.S. Environmental Protection Agency (USEPA) Source Classification Code (SCC) for the proposed turbines is 2-02-002-01.

The new turbines will be equipped with advanced dry-low-NO_x combustion controls, known by the manufacturer as SoLoNO_x. These controls reduce nitrogen oxides (NO_x) and peak combustion temperatures through the use of a lean, premixed air/fuel mixture and advanced combustion controls. The SoLoNO_x system is operational at turbine loads from approximately 50% to 100% of full load. During operation at low turbine loads (<50% of full load), low ambient temperatures (<0 °F), and during turbine startup and shutdown, supplemental pilot fuel is fired for flame stability and results in NO_x, carbon monoxide (CO), and volatile organic compounds (VOC) concentrations that are higher than during SoLoNO_x operation. Estimated emissions during each of the operating modes are summarized in Table N-3 of Attachment N. Additional turbine emission data and calculations are presented in Attachment N.

The new Solar Mars 100 turbines are expected to operate essentially the entire year, and emission estimates are based on 8,760 operating hours per year. Because the SoLoNO_x controls cannot operate properly at low ambient temperatures or below 50% of peak load, the potential emission estimates presented in Table N-3 include separate lines for operating hours at: (1) ambient temperatures less than or equal to 0 °F, (2) low load (less than 50% load), and (3) startup/shutdown cycles. Operation at low ambient temperature is based on a total of 144 hours per year for the aggregate of the three turbines, while operation at low load is based on a total of 195 hours per year. Startup/shutdown cycles are limited to 600 cycles per year for the aggregate of the three turbines. That is, the non-SoLoNO_x operation listed in Table N-3 is not intended to be a limitation per turbine; instead, the aggregate of non-SoLoNO_x operation is intended to be applicable to any or all three of the turbines. Annual emissions from the proposed turbines during the rest of the year are conservatively based on an ambient temperature of 32 °F. Combustion turbine power varies with atmospheric conditions such that maximum heat input, maximum fuel consumption, and associated emissions generally increase as ambient temperature decreases. For the purpose of this application, turbine emissions have been characterized based on an ambient temperature of 32 °F. The annual average ambient temperature is approximately 56 °F.

The Project will include installation of one 880-hp, natural gas-fired emergency generator for which potential emissions are based on operation of up to 100 hours per year. Potential emissions from this unit are based on NSPS Subpart JJJ emission limitations for NO_x, CO, and VOC, and AP-42 emission factors for other air pollutants. The Station will also be installing two fuel gas heaters, one rated at 0.40 MMBtu/hr and one at 0.25 MMBtu/hr. In addition, 49 catalytic heaters of various sizes will be installed. Potential emissions from these units are based on AP-42 emission factors. In addition, the (4) 2500 gallon condensate tank and (1) 1000 gal waste water tank will be de minimis sources per Table 45-13B of West Virginia regulation 45 CSR 13.

Potential annual emissions of NO_x, CO, VOC, greenhouse gases as carbon dioxide equivalents (CO₂e), sulfur dioxide (SO₂), respirable particulate matter with an aerodynamic diameter of less than or equal to 10 microns (PM₁₀), fine particulate matter with an aerodynamic diameter of less than or equal to 2.5 microns (PM_{2.5}), formaldehyde [CH₂O, the primary hazardous air pollutant (HAP)], and total HAPs from all sources associated with the Project are provided in Table N-1 of Attachment N. Source-specific emissions calculations are also provided in Attachment N.

The target date for starting construction is March 2017. Initial commercial operation is scheduled for May 2018.

Kanawha County is designated as not meeting the secondary National Ambient Air Quality Standard (NAAQS) for total suspended particulate (TSP); although, there is no NAAQS for TSP. Kanawha County is classified as attainment or unclassifiable for all other NAAQS.

The Station is located approximately 148 kilometers west-southwest of the nearest Class I Area, the Otter Creek Wilderness Area.

3.0 REGULATORY ANALYSIS AND COMPLIANCE METHODS

This section reviews the applicability of state and federal regulations potentially affecting the new emission units and proposed compliance procedures. Supporting calculations are included in Attachment N.

3.1 Prevention of Significant Deterioration

West Virginia implements the Prevention of Significant Deterioration (PSD) permitting program pursuant to the USEPA-approved West Virginia State Implementation Plan and in accordance with Regulation 14 (a.k.a., Series 14) of Title 45 of the Code of State Rules (45 CSR 14). Regulation 14 closely mirrors federal PSD regulations at 40 CFR §52.21. PSD requirements for new emissions units apply when a proposed new facility has the potential to emit (PTE) 250 tpy or more of any PSD-regulated pollutant (such as NO_x, CO, PM₁₀, PM_{2.5}, or SO₂) per §45-14-2.43. Because the Station's PTE does not exceed 250 tpy for any PSD-regulated pollutant, the Station is not subject to PSD requirements.

Per §45-14-2.80.e.1, following July 1, 2011, new major stationary sources with the potential to emit greater than or equal to 100,000 tpy of CO_{2e} were required to meet the requirements set forth in the PSD program. The provisions of §45-14-2.80.f, however, clarify that this portion of the rule ceases to be effective under certain circumstances, including a federal court decision invalidating provisions of the rule. On June 23, 2014, the U.S. Supreme Court issued a decision that greenhouse gas emissions could not be a basis for PSD or Title V applicability, and this decision was followed by a July 24, 2014 memorandum from the USEPA that stated that the USEPA will comply with the Court's decision and will not apply or enforce regulations that would require a PSD permit where PSD would be applicable solely because of GHG emissions. Therefore, CO_{2e} emissions are no longer considered for PSD applicability.

3.2 New Source Performance Standards

New Source Performance Standards (NSPS) apply to new, modified, or reconstructed stationary sources meeting criteria established in 40 CFR Part 60. Sections 3.2.1 and 3.2.2 describe requirements that apply to the units proposed for the new Station.

Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) applies to steam generating units with a maximum design heat input capacity of greater than or equal to 10 MMBtu/hr, but less than or equal to 100 MMBtu/hr, which are constructed, modified or reconstructed after June 9, 1989 (per 40 CFR §60.40c(a)). Steam generating units are defined in 40 CFR §60.41c as devices that combust fuel and heat water or any heat transfer medium. Since the proposed heaters will be rated at 0.40 MMBtu/hr and 0.25 MMBtu/hr, this NSPS is not applicable. The proposed catalytic heaters are not steam generating units.

Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution) is not applicable to the proposed new equipment (no affected facilities proposed) per 40 CFR §60.5365.

Columbia requests a permit shield for NSPS Subpart Dc and Subpart OOOO.

3.2.1 Stationary Gas Turbines (40 CFR 60 Subpart KKKK)

The USEPA has promulgated NSPS for stationary combustion turbines in 40 CFR 60 Subpart KKKK. New combustion turbines, such as the proposed Solar Mars 100 turbines, that have a peak heat input of 10 MMBtu/hr and greater, will be subject to the requirements of Subpart KKKK per 40 CFR §60.4305(a). Sources covered by Subpart KKKK are exempt from the requirements in Subpart GG (the previous combustion turbine NSPS) per 40 CFR §60.4305(b). The subcategory and corresponding NO_x emission

standard as established in Table 1 to Subpart KKKK for each of the proposed turbines is presented in Table 3-1.

Table 3-1 Proposed Turbines and Corresponding Category and Emission Standard

Unit	Table 1 subcategory	Heat input	NO _x Emission Standard	Manufacturer's Warranty
Solar Mars 100 (T01, T02, T03)	New turbine firing natural gas	> 50 MMBtu/hr and ≤ 850 MMBtu/hr	25 ppm at 15 percent O ₂ or 150 ng/J of useful output (1.2 lb/MWh)	15 ppm at 15% O ₂

Table 1 to Subpart KKKK also establishes a NO_x emission limit of 150 ppm at 15% O₂ or 1,100 ng/J of useful output (8.7 lb/MWh) for turbines with a peak capacity equal to or less than 30 MW output which are operating at less than 75% of peak load or at temperatures less than 0 °F.

The fuel sulfur limit in Subpart KKKK is 0.060 lb SO₂/MMBtu. Under 40 CFR §60.4365, a source is exempt from monitoring fuel sulfur content if the source burns natural gas that is covered by a purchase or transportation agreement with maximum sulfur content of 20 grains per 100 scf, which is the case for the proposed turbine fuel.

The proposed NO_x emission rates and fuel sulfur levels comply with NSPS limits. To demonstrate compliance with Subpart KKKK, 40 CFR §60.4400 requires an initial NO_x performance test using EPA reference methods. The initial compliance test must be conducted within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented, annual performance testing using EPA reference methods must be conducted within 14 calendar months following the previous performance test. The test frequency can be reduced to biennial if measured NO_x emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be approved for annual turbine testing. In addition, Columbia will continuously monitor the turbines to document any operating periods during which the SoLoNO_x system is not in service (e.g., during startup, shutdown, low-load, or a system malfunction). Records of turbine startup, shutdown, SoLoNO_x malfunction, and/or SoLoNO_x monitoring system malfunction will be recorded per Subpart KKKK and NSPS General Provisions in 40 CFR §60.7(b)&(c).

Compliance with the SO₂ and fuel sulfur limits can be demonstrated by monitoring natural gas sulfur content annually. However, per 40 CFR §60.4365(a), the turbines will be exempt from periodic monitoring by demonstrating compliance with the FERC tariff limit on total sulfur content of 20 grains of sulfur or less per 100 standard cubic feet.

3.2.2 Stationary Spark Ignition Internal Combustion Engines (40 CFR 60 Subpart JJJJ)

Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines) applies to stationary spark ignition engine manufacturers and owners/operators. For natural gas-fired emergency engines manufactured after January 1, 2009, the applicable emission limits for engines greater than 130 hp rated capacity are specified in Table 1¹ of Subpart JJJJ as follows:

- For NO_x, the limit is 2.0 g/hp-hr or 160 ppmvd at 15 percent O₂;
- For CO, the limit is 4.0 g/hp-hr or 540 ppmvd at 15 percent O₂; and
- For VOC, the limit is 1.0 g/hp-hr or 86 ppmvd at 15 percent O₂.

¹ Compliance with the emission limits specified in Table 1 of Subpart JJJJ is required by 40 CFR §60.4233(e).

The proposed emergency generator will be subject to the Subpart JJJJ emission limits for engines greater than 130 hp. Based on manufacturer data, the engine will comply with these emission limits.

3.3 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) are promulgated under 40 CFR Part 63 for specific processes and HAP emissions. The proposed Station has potential HAP emissions that are less than the major source threshold and will therefore be considered an area source of HAPs.²

40 CFR 63 Subpart YYYY for stationary combustion turbines is only applicable to major sources of HAPs per 40 CFR §63.6085; therefore, the turbines are not subject to this regulation.

Subpart ZZZZ for stationary reciprocating internal combustion engines is applicable to the proposed emergency generator. The proposed emergency generator is a new stationary reciprocating internal combustion engine located at an area source of HAPs. As such, the engine meets the requirements of Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ per 40 CFR §63.6590(c)(1). No further requirements apply.

There are two NESHAPs which regulate emissions from industrial, commercial and institutional boilers – 40 CFR 63 Subpart DDDDD (major sources of HAPs) and 40 CFR 63 Subpart JJJJJ (area sources of HAPs). The proposed Station will be an area source of HAPs; Subpart JJJJJ is the applicable NESHAP for the Station. Per 40 CFR §63.11195(e), natural gas-fired sources are exempt from the requirements of this Subpart.

3.4 Compliance Assurance Monitoring (40 CFR 64)

Compliance Assurance Monitoring (CAM) requirements in 40 CFR Part 64 are intended to assure that emission control equipment is properly operated and maintained. CAM applies to emissions units that:

1. have an emission limitation,
2. use a control device to comply with the emissions limit, and
3. have sufficient emissions to be classified as a major emission source under 40 CFR Part 70.

As defined in 40 CFR §64.1, "control device" means add-on control equipment other than inherent process equipment that is used to destroy or remove air pollutant(s) prior to discharge to the atmosphere. The definition also states that "a control device does not include use of combustion or other process design features or characteristics."

Exemptions specified in 40 CFR §64.2(b) include units complying with an emission limitation or standard proposed by the USEPA after November 15, 1990 pursuant to Section 111 or 112 of the Clean Air Act (NSPS or NESHAP).

Potential emissions from each turbine are less than the Part 70 major source threshold specified in 40 CFR §70.2. Additionally, the proposed turbines will not use any add-on emission controls and will be subject to a federal NSPS promulgated after 1990. As such, the proposed turbines are exempt from CAM requirements.

² Per 40 CFR §63.2, an area source of HAPs is defined as a stationary source or group of sources with the potential to emit less than 10 tpy of any HAP and less than 25 tpy of any combination of HAPs.

3.5 Prevention and Control of Emission of Smoke and Particulate Matter (45 CSR 2)

West Virginia Regulation 45 CSR 2 requires that smoke and particulate matter emissions from any fuel-burning unit (providing heat or power by indirect heat transfer) not exceed opacity levels of 10 percent based on a six-minute block average (per §45-2-3.1). The proposed equipment (e.g., fuel gas heaters) are inherently compliant with this requirement by combusting only pipeline quality natural gas.

3.6 Prevention and Control of Emission of Sulfur Dioxide (45 CSR 10)

West Virginia Regulation 45 CSR 10 limits SO₂ emissions from fuel-burning units, manufacturing processes, and combustion of refinery or process gas streams. The turbines and emergency generator are not considered fuel-burning units per the definition in §45-10-2. Additionally, the Station is not defined as a manufacturing process and does not combust refinery or process gas streams. Additionally, fuel burning units less than 10 MMBtu/hr, including the proposed heaters, are exempt from section 3 and sections 6 through 8 of this regulation. Therefore, 45 CSR 10 does not apply to the Project.

3.7 Pre-construction Permitting under West Virginia Air Regulation 13 (45 CSR 13)

Because the potential to emit from the proposed Project does not exceed PSD applicability thresholds, the Project is not classified as major for PSD purposes and is required to obtain a construction permit per 45 CSR 13. This document contains the information required by the permitting program.

3.8 Requirements for Operating Permits (45 CSR 30)

Because the PTE for the proposed Station will exceed the Title V threshold of 100 tpy for CO, a Title V permit is required for continued operation of the Station. In accordance with 45 CSR §30-4.1.a.2, a Title V permit application will be submitted within 12 months after commencement of operation of the permitted emissions sources.

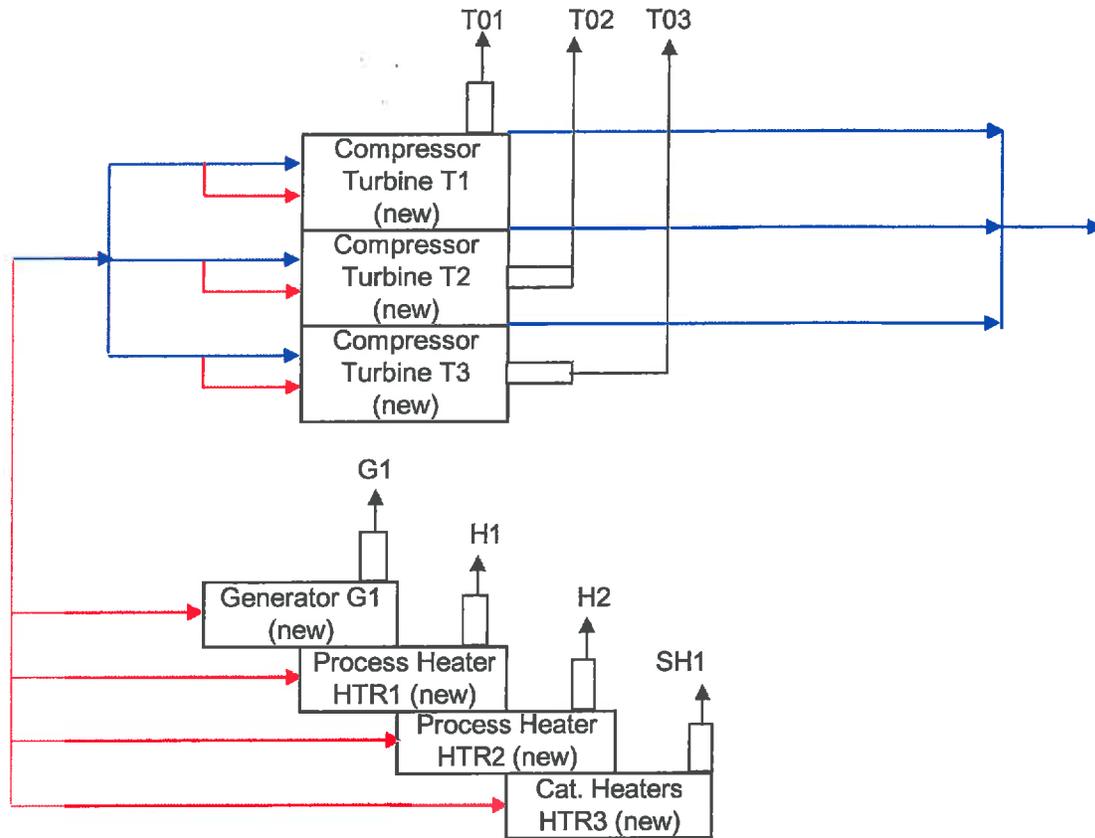
Attachment E

Plot Plan

Attachment F

Detailed Process Flow Diagram

ATTACHMENT F ELK RIVER COMPRESSOR STATION PROCESS FLOW DIAGRAM



- Transmission Gas Stream
- Fuel Gas
- Emission Stream



Attachment H

SDSs

SDS will be provided upon request. The proposed facility will use, handle, and store materials that are typical for a natural gas compressor station. Pipeline quality natural gas will be the primary raw material and fuel. Small quantities of lubricating oils, pipeline condensate and waste liquids will also be handled and stored at the facility.

Attachment G

Process Description

Process Description

Pipeline transmission of natural gas requires that the gas be compressed. Three Mars Solar turbine-driven compressors (15,600 hp each) will be installed at the proposed Elk River Compressor Station. The Project also includes the installation of one Waukesha 880-hp emergency generator, two fuel gas heaters (0.4 MMBtu/hr and 0.25 MMBtu/hr), forty-nine catalytic heaters, and (4) 2500 gallon condensate tanks and (1) 1000 gallon waste water tank. The remainder of this discussion is specific to the turbine technology.

The power output from a natural gas-fired turbine is directly related to the fuel input rate and to the ratio of combustion air to fuel. As ambient temperatures decrease, a turbine's maximum power output will increase due to the increased density of inlet air. The Solar dry low NO_x (DLN) combustion system (known as SoLoNO_x) limits formation of NO_x, CO, and VOC by pre-mixing air and fuel prior to combustion. When operating a Solar Mars 100 turbine at ambient temperatures ≥ 0 °F and at loads $\geq 50\%$, this DLN system is able to limit the exhaust gas concentration of these pollutants (corrected to 15% O₂) to 15 ppm NO_x, 25 ppm CO, and 25 ppm unburned hydrocarbons (UHC, containing at least 80% non-VOC methane and ethane; therefore, 5 ppm VOC). At ambient temperatures less than or equal to 0 °F, additional pilot fuel is required by the turbine to maintain flame stability, which increases estimated emission concentrations to 42 ppm NO_x, 100 ppm CO, and 50 ppm UHC (10 ppm VOC). At turbine loads $< 50\%$, additional pilot fuel and air flow are required to maintain flame stability and turbine responsiveness. These changes increase estimated emission concentrations to 66 ppm NO_x, 4,400 ppm CO, and 440 ppm UHC (88 ppm VOC). Should loads drop below 50%, Columbia will make every effort to either bring the load back above 50% or shut a turbine down (e.g., shut down other units and move that volume to the turbine, or shift the turbine volume to other units and shut down the turbine).

In addition, there are changes in NO_x, CO, and VOC emissions during the initial fuel light-off, turbine loading, and flame stabilization steps associated with turbine startup. There are also changes in emissions during the normal turbine shutdown sequence. Startup/shutdown cycles are limited to a total of 600 cycles per year for the aggregate of the three turbines. For a Solar Mars 100 turbine, the startup sequence takes less than 10 minutes to complete prior to engaging the DLN system. The shutdown sequence for a Solar Mars 100 turbine requires approximately 10 minutes. Emissions during each startup/shutdown cycle are estimated by Solar as provided in Attachment N.

Based on the manufacturer's estimated emission concentrations (ppm) and exhaust flow rates (scf), mass emissions rates (lb/hr) during the above operating modes are presented in Table N-3 within Attachment N. Additional information on turbine operating characteristics and emissions is provided in Attachment N to this application.

Attachment I

Emission Units Table

Attachment I

Emission Units Table

(Includes all emission units and air pollution control devices
that will be part of this permit application review, regardless of permitting status)

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type ³ and Date of Change	Control Device ⁴
T1	T01	Solar Mars 100 Turbine #1	2017	15,600 HP @ 32 °F	New, 2017	-
T2	T02	Solar Mars 100 Turbine #2	2017	15,600 HP @ 32 °F	New, 2017	-
T3	T03	Solar Mars 100 Turbine #3	2017	15,600 HP @ 32 °F	New, 2017	-
G1	G1	Emergency Generator	2017	880 HP	New, 2017	-
HTR1	H1	Fuel Gas Heater #1	2017	0.40 MMBTU/hr	New, 2017	-
HTR2	H2	Fuel Gas Heater #2	2017	0.25 MMBtu/hr	New, 2017	-
HTR3	SH1	49 Catalytic Heaters	2017	8 x 0.005, 27 x 0.072, 14 x 0.03 MMBtu/hr	New, 2017	-

¹ For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

² For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

³ New, modification, removal

⁴ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J

Emission Points Data Summary Sheet

**Attachment J
EMISSION POINTS DATA SUMMARY SHEET**

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
T01	Upward vertical stack	T1						NO _x	7.21	32.29			Gas	EE	
								CO	7.31	80.63			Gas	EE	
								VOC	0.84	4.19	-	-	Gas	EE	
								SO ₂	7.61	0.42			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.88	3.85			Solid	EE	
								CH ₂ O	0.09	0.41			Gas	EE	
T02	Upward vertical stack	T2						NO _x	7.21	32.29			Gas	EE	
								CO	7.31	80.63			Gas	EE	
								VOC	0.84	4.19			Gas	EE	
								SO ₂	7.61	0.42			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.88	3.85			Solid	EE	
								CH ₂ O	0.09	0.41			Gas	EE	
T03	Upward vertical stack	T3						NO _x	7.21	32.29			Gas	EE	
								CO	7.31	80.63			Gas	EE	
								VOC	0.84	4.19			Gas	EE	
								SO ₂	7.61	0.42			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.88	3.85			Solid	EE	
								CH ₂ O	0.09	0.41			Gas	EE	
G1	Upward vertical stack	G1						NO _x	3.88	0.19			Gas	EE	
								CO	7.76	0.39			Gas	EE	
								VOC	1.94	0.10			Gas	EE	
								SO ₂	0.39	0.0002			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.07	0.003			Solid	EE	
								CH ₂ O	0.37	0.02			Gas	EE	
H1	Upward vertical stack	HTRI						NO _x	0.04	0.17			Gas	EE	
								CO	0.03	0.14			Gas	EE	
								VOC	0.002	0.01			Gas	EE	
								SO ₂	0.02	0.001			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.003	0.01			Solid	EE	
								CH ₂ O	0.00003	0.0001			Gas	EE	

**Attachment J
EMISSION POINTS DATA SUMMARY SHEET**

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
H2		HTR2						NO _x	0.02	0.11			Gas	EE	
								CO	0.02	0.09			Gas	EE	
								VOC	0.001	0.01			Gas	EE	
								SO ₂	0.01	0.0008			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.002	0.01			Solid	EE	
								CH ₂ O	0.00002	0.00008			Gas	EE	
SH1		HTR3						NO _x	0.24	1.03			Gas	EE	
								CO	0.20	0.87			Gas	EE	
								VOC	0.01	0.06			Gas	EE	
								SO ₂	0.14	0.01			Gas	EE	
								PM / PM ₁₀ / PM _{2.5}	0.02	0.08			Solid	EE	
								CH ₂ O	0.0002	0.0008			Gas	EE	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).
- List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.
- Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).
- Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m³) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. <i>(Must match Emission Units Table)</i>	Inner Diameter (ft.)	Temp. (°F)	Exit Gas		Emission Point Elevation (ft)			UTM Coordinates (km)	
			Volumetric Flow ¹ (acfm) <i>at operating conditions</i>	Velocity (fps)	Ground Level <i>(Height above mean sea level)</i>	Stack Height ² <i>(Release height of emissions above ground level)</i>	Northing	Easting	
T01	10.16	889	203,635	41.9	625	70.5	4,259.9	471.8	
T02	10.16	889	203,635	41.9	625	70.5	4,259.9	471.8	
T03	10.16	889	203,635	41.9	625		4,259.9	471.8	
G1	0.83	841	4,643	141.9	625		4,259.9	471.8	
H1					625		4,259.9	471.8	
H2					625		4,259.9	471.8	
SH1					625		4,259.9	471.8	

¹ Give at operating conditions. Include inerts.
² Release height of emissions above ground level.
³ Effective diameter based on 9' x 9' square duct.

Attachment K

Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No The emissions are de minimus <input type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES; complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads						
Unpaved Haul Roads						
Storage Pile Emissions						
Loading/Unloading Operations						
Wastewater Treatment Evaporation & Operations						
Equipment Leaks	Methane CO ₂ GHG (CO ₂ e)	Does not apply	15.48 0.45 387.43	Does not apply	15.48 0.45 387.43	EE EE EE
General Clean-up VOC Emissions						
Other						

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

² Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

³ Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

⁴ Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	light liquid VOC ^{6,7}				
	heavy liquid VOC ⁸				
	Non-VOC ⁹				
Valves ¹⁰	Gas VOC	N/A - less than 10% VOC			
	Light Liquid VOC				
	Heavy Liquid VOC				
Safety Relief Valves ¹¹	Non-VOC	36	0	N/A	12,462 lb CH ₄ /yr
	Gas VOC	N/A - less than 10% VOC			
	Non VOC	16	0	N/A	250 lb CH ₄ /yr
Open-ended Lines ¹²	VOC	N/A - less than 10% VOC			
	Non-VOC	77	0	N/A	9,764 lb CH ₄ /yr
	VOC	N/A - less than 10% VOC			
Sampling Connections ¹³	Non-VOC	6	0	N/A	158 lb CH ₄ /yr
	VOC	N/A - less than 10% VOC			
	VOC	N/A - less than 10% VOC			
Compressors	Non-VOC	3	0	N/A	N/A - emissions included in other component estimates
	VOC	N/A - less than 10% VOC			
	Non-VOC	314	0	N/A	8,294 lb CH ₄ /yr
Flanges	VOC	N/A - less than 10% VOC			
	Non-VOC	3 meters	0	N/A	30 lb CH ₄ /yr
	VOC				
Other	Non-VOC				
	VOC				
	Non-VOC				

1 - 13 See notes on the following page.

Attachment L

Emissions Unit Data Sheets

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): T1

1. Name or type and model of proposed affected source:

Solar Mars 100 turbine. Proposed emission point ID T01.

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

N/A

4. Name(s) and maximum amount of proposed material(s) produced per hour:

N/A

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

Natural gas combustion products.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
1,144.7 million cubic feet per year (equivalent to 1,167,610 MMBtu/yr) for Turbine T01.			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:			
methane	93.25	All values in volume percent.	
ethane	3.68		
propane	0.88		
I-Butane	0.07		
N-Butane	0.19		
I-Pentane	0.03		
N-Pentane	0.003		
Hexane	0.012		
Carbon Dioxide	0.99	Nitrogen 0.89	Sulfur Dioxide 0.0001 ash - nil
(c) Theoretical combustion air requirement (ACF/unit of fuel):			
	@	°F and	psia.
(d) Percent excess air:			
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:			
133.29 MMBtu/hr at 32 °F			
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:			
N/A			
(g) Proposed maximum design heat input:		133.29	× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
Hours/Day	24	Days/Week	7
		Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	32	°F and	Full Load	psia
a. NO _x	7.21	lb/hr		grains/ACF
b. SO ₂	7.61	lb/hr		grains/ACF
c. CO	7.31	lb/hr		grains/ACF
d. PM ₁₀	0.88	lb/hr		grains/ACF
e. Hydrocarbons	4.19	lb/hr		grains/ACF
f. VOCs	0.84	lb/hr		grains/ACF
g. Pb	0	lb/hr		grains/ACF
h. Specify other(s)				
CO _{2e}	15,608	lb/hr		grains/ACF
Formaldehyde	0.09	lb/hr		grains/ACF
		lb/hr		grains/ACF
		lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
 Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

To demonstrate compliance with the turbine annual emission rates in the permit, Columbia proposes to maintain the following records:

- 1) Monthly operating hours,
- 2) Monthly operating hours at less than 50% load,
- 3) Monthly operating hours at less than or equal to 0 °F ambient temperature, and
- 4) Monthly number of startup and shutdown cycles.

RECORDKEEPING

Maintain records of monitored parameters.

REPORTING

Notification of start-up date will be submitted within 15 days of start-up. Performance test report will be submitted before the close of business on the 60th day following the completion of testing.

TESTING

Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NOx emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be allowed for annual turbine testing.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Emissions warranted above ambient temperatures of -20° F and at loads between 50 and 100% of design. Solar provides guidance on estimating emission outside those conditions but does not warrant the rates. A complete maintenance manual is beyond the scope of this form but can be provided upon request.

**Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): T2

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Mars 100 turbine. Proposed emission point ID T02.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	32	°F and	Full Load	psia
a. NO _x	7.21	lb/hr		grains/ACF
b. SO ₂	7.61	lb/hr		grains/ACF
c. CO	7.31	lb/hr		grains/ACF
d. PM ₁₀	0.88	lb/hr		grains/ACF
e. Hydrocarbons	4.19	lb/hr		grains/ACF
f. VOCs	0.84	lb/hr		grains/ACF
g. Pb	0	lb/hr		grains/ACF
h. Specify other(s)				
CO _{2e}	15,608	lb/hr		grains/ACF
Formaldehyde	0.09	lb/hr		grains/ACF
		lb/hr		grains/ACF
		lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
 Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING
 To demonstrate compliance with the turbine annual emission rates in the permit, Columbia proposes to maintain the following records:

- 1) Monthly operating hours,
- 2) Monthly operating hours at less than 50% load,
- 3) Monthly operating hours at less than or equal to 0 °F ambient temperature, and
- 4) Monthly number of startup and shutdown cycles.

RECORDKEEPING
 Maintain records of monitored parameters.

REPORTING
 Notification of start-up date will be submitted within 15 days of start-up. Performance test report will be submitted before the close of business on the 60th day following the completion of testing.

TESTING
 Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NOx emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be allowed for annual turbine testing.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Emissions warranted above ambient temperatures of -20° F and at loads between 50 and 100% of design. Solar provides guidance on estimating emission outside those conditions but does not warrant the rates. A complete maintenance manual is beyond the scope of this form but can be provided upon request.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): T3

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Mars 100 turbine. Proposed emission point ID T03.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	32	°F and	Full Load	psia
a. NO _x	7.21	lb/hr		grains/ACF
b. SO ₂	7.61	lb/hr		grains/ACF
c. CO	7.31	lb/hr		grains/ACF
d. PM ₁₀	0.88	lb/hr		grains/ACF
e. Hydrocarbons	4.19	lb/hr		grains/ACF
f. VOCs	0.84	lb/hr		grains/ACF
g. Pb	0	lb/hr		grains/ACF
h. Specify other(s)				
CO _{2e}	15,608	lb/hr		grains/ACF
Formaldehyde	0.09	lb/hr		grains/ACF
		lb/hr		grains/ACF
		lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
 Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

To demonstrate compliance with the turbine annual emission rates in the permit, Columbia proposes to maintain the following records:

- 1) Monthly operating hours,
- 2) Monthly operating hours at less than 50% load,
- 3) Monthly operating hours at less than or equal to 0 °F ambient temperature, and
- 4) Monthly number of startup and shutdown cycles.

RECORDKEEPING

Maintain records of monitored parameters.

REPORTING

Notification of start-up date will be submitted within 15 days of start-up. Performance test report will be submitted before the close of business on the 60th day following the completion of testing.

TESTING

Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NOx emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be allowed for annual turbine testing.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Emissions warranted above ambient temperatures of -20° F and at loads between 50 and 100% of design. Solar provides guidance on estimating emission outside those conditions but does not warrant the rates. A complete maintenance manual is beyond the scope of this form but can be provided upon request.

**Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): G1

<p>1. Name or type and model of proposed affected source:</p> <p>Waukesha Emergency Generator. Proposed emission point ID G1.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural gas at a designed fuel usage of 6,692 ft³/hr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

methane 93.25 All values in volume percent.
 ethane 3.68
 propane 0.88
 I-Butane 0.07
 N-Butane 0.19
 I-Pentane 0.03
 N-Pentane 0.003
 Hexane 0.012
 Carbon Dioxide 0.99 Nitrogen 0.89 Sulfur Dioxide 0.0001 ash - nil

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

6.83 MMBtu/hr

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: 6.83 × 10⁸ BTU/hr.

7. Projected operating schedule: 100 Hours/year

Hours/Day	Days/Week	Weeks/Year
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8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	14.7	psia
a. NO _x	3.88	lb/hr	grains/ACF
b. SO ₂	0.39	lb/hr	grains/ACF
c. CO	7.76	lb/hr	grains/ACF
d. PM ₁₀	0.07	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	1.94	lb/hr	grains/ACF
g. Pb	0	lb/hr	grains/ACF
h. Specify other(s)			
CO _{2e}	799	lb/hr	grains/ACF
Formaldehyde	0.37	lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
 Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

To demonstrate compliance, Columbia proposes to maintain monthly operating hours. This monthly record will be used to track 12-month rolling operating hours.

RECORDKEEPING

Maintain records of monitored parameters

REPORTING

The 12-month rolling operating hours will be reported to the state as part of the station's semi-annual monitoring report. Performance test report will be submitted before the close of business on the 60th day following the completion of testing.

TESTING

Initial and subsequent performance tests per 40 CFR 60 Subpart JJJJ.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
 N/A

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): HTR1

<p>1. Name or type and model of proposed affected source:</p> <p>Fuel Gas heater. Proposed emission point ID H1.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	14.7	psia
a. NO _x	0.04	lb/hr	grains/ACF
b. SO ₂	0.02	lb/hr	grains/ACF
c. CO	0.03	lb/hr	grains/ACF
d. PM ₁₀	0.003	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.002	lb/hr	grains/ACF
g. Pb	0	lb/hr	grains/ACF
h. Specify other(s)			
CO _{2e}	47	lb/hr	grains/ACF
Formaldehyde	0.00003	lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.
 (2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

Columbia assumes this unit will operate 8760 hours per year. No monitoring, recordkeeping, reporting, or testing is required for this unit.

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

**Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): HTR2

<p>1. Name or type and model of proposed affected source:</p> <p>Process heater. Proposed emission point ID H2.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):			
(a) Type and amount in appropriate units of fuel(s) to be burned:			
Natural gas at a designed fuel usage of 245 ft ³ /hr.			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:			
methane	93.25	All values in volume percent.	
ethane	3.68		
propane	0.88		
I-Butane	0.07		
N-Butane	0.19		
I-Pentane	0.03		
N-Pentane	0.003		
Hexane	0.012		
Carbon Dioxide	0.99	Nitrogen 0.89	Sulfur Dioxide 0.0001 ash - nil
(c) Theoretical combustion air requirement (ACF/unit of fuel):			
	@	°F and	psia.
(d) Percent excess air:			
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:			
0.25 MMBtu/hr			
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:			
N/A			
(g) Proposed maximum design heat input:		0.25	× 10 ⁶ BTU/hr.
7. Projected operating schedule:			
Hours/Day	24	Days/Week	7
		Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	14.7	psia
a. NO _x	0.02	lb/hr	grains/ACF
b. SO ₂	0.01	lb/hr	grains/ACF
c. CO	0.02	lb/hr	grains/ACF
d. PM ₁₀	0.002	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.001	lb/hr	grains/ACF
g. Pb	0	lb/hr	grains/ACF
h. Specify other(s)			
CO _{2e}	29	lb/hr	grains/ACF
Formaldehyde	0.00002	lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

Columbia assumes this unit will operate 8760 hours per year. No monitoring, recordkeeping, reporting, or testing is required for this unit.

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

**Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): HTR3

<p>1. Name or type and model of proposed affected source:</p> <p>49 Catalytic heaters. Proposed emission point ID SH1.</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>N/A</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Natural gas combustion products.</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	°F and	14.7	psia
a. NO _x	0.24	lb/hr	grains/ACF
b. SO ₂	0.14	lb/hr	grains/ACF
c. CO	0.20	lb/hr	grains/ACF
d. PM ₁₀	0.02	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.01	lb/hr	grains/ACF
g. Pb	0	lb/hr	grains/ACF
h. Specify other(s)			
CO _{2e}	282	lb/hr	grains/ACF
Formaldehyde	0.0002	lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

Columbia assumes this unit will operate 8760 hours per year. No monitoring, recordkeeping, reporting, or testing is required for this unit.

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
N/A

Attachment N

Supporting Emissions Calculations

Columbia Gas Transmission, LLC
 Elk River Compressor Station
 Jan 2016 Application

Table N-1 - Facility Total PTE

Source	Capacity	Annual Emissions (tpy)										
		NO _x	CO	CO ₂ e	PM ₁₀ /PM _{2.5}	VOC	SO ₂	CH ₂ O	Total HAP			
T01 - Solar Mars 100 Turbine #1	15,600 hp (32 °F)	32.29	80.63	68,362	3.85	4.19	0.42	0.41	0.60			
T02 - Solar Mars 100 Turbine #2	15,600 hp (32 °F)	32.29	80.63	68,362	3.85	4.19	0.42	0.41	0.60			
T03 - Solar Mars 100 Turbine #3	15,600 hp (32 °F)	32.29	80.63	68,362	3.85	4.19	0.42	0.41	0.60			
G1 - Waukesha Emergency Generator	880 hp	0.19	0.39	40	3.41E-03	9.70E-02	2.44E-04	0.02	0.03			
H1 - Process Heater #1	0.40 MMBtu/hr	0.17	0.14	205	0.01	0.01	1.25E-03	1.29E-04	3.24E-03			
H2 - Process Heater #2	0.25 MMBtu/hr	0.11	0.09	128	0.01	0.01	7.82E-04	8.05E-05	2.03E-03			
SH1 - (49) Catalytic Heaters	Various	1.03	0.87	1,233	0.08	0.06	7.52E-03	7.74E-04	0.02			
Equipment Leaks (fugitive emissions) ¹				387		0.60						
Venting				20,946		32.35						
Facility PTE ²		98.38	243.38	227,640	11.66	45.10	1.26	1.26	1.85			
PSD Major Source Threshold		250	250	n/a	n/a	250	250	n/a	n/a			
Title V Threshold		100	100	n/a	100	100	100	10	25			
Applicability		None, Natural Minor	Title V	None, Natural Minor	None, Natural Minor	None, Natural Minor	None, Natural Minor	None, Area Source	None, Area Source			

1. Fugitive emissions are not part of PSD applicability analysis.

2. Excludes fugitive emissions (compressor stations are not one of the names source categories that include fugitive emissions).

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 Table N-2 - Solar Mars 100 Turbines (T01, T02, & T03)

Horsepower 15,600 hp (32 °F)
 Brake Specific Fuel Consumption 7697 Btu/Bhp-hr (LHV, 32 °F)
 Total Heat Input 120.08 MMBtu/hr (LHV, 32 °F)
 133.29 MMBtu/hr (HHV, 32 °F)³
 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 32 °F)
 Quantity 3

Pollutant	Emission Factor		lb/hr ¹	Emission Rate		Emission Factor Reference
	ppmvd@15%O ₂	lb/MMBtu		ton/yr ²	ton/yr (3 turbines)	
NO _x	15.00	0.060 LHV	7.21	32.29	96.87	Vendor Data
CO	25.00	0.061 LHV	7.31	80.63	241.89	Vendor Data
CO _{2e}		117.1 HHV	15,608	68,362	205,087	40 CFR 98 Subpart C
PM ₁₀		0.0066 HHV	0.88	3.85	11.56	AP-42 Table 3.1-2a (4/00)
PM _{2.5}		0.0066 HHV	0.88	3.85	11.56	AP-42 Table 3.1-2a (4/00)
VOC	5.00	0.007 LHV	0.84	4.19	12.58	Vendor Data (20% of UHC) ⁴
SO ₂ (Maximum Hourly)		0.0571 HHV	7.61			20 grains S / 100 scf
SO ₂ (Average Annual)		0.000714 HHV		0.42	1.25	0.25 grains S / 100 scf
Formaldehyde		0.00071 HHV	0.09	0.41	1.24	AP-42 Table 3.1-3 (4/00)
Total HAPs		0.00103 HHV	0.14	0.60	1.80	AP-42 Table 3.1-3 (4/00)

1. Maximum hourly emission rate based on normal operation at 32 °F. Heat input, fuel consumption, and emissions increase as temperature decreases, and for the purpose of this application, hourly emissions are characterized by Solar emissions data for 32 °F.
2. Annual emission rate based on combination of potential operating modes as provided on following page for NO_x, CO, and VOC.
All other pollutants based on horsepower and brake specific fuel consumption at 32 °F.
3. HHV heat input based on HHV=1.11*LHV
4. VOC based on 20% of vendor data for unburned hydrocarbon.

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 Table N-3 - 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

1. Based on data from Solar Mars 100 Compressor Set data sheet and the following concentrations:
 15 ppm NO_x; 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 PIL 170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO _x ton/yr	CO ton/yr	VOC ton/yr
	Cycles	hr/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 ₂ O
T01, T02, T03 / Solar Mars 100	0.21	0.21	0.02	0.22	0.03	0.003

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.

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Table N-4 - 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 ₂ e ⁴	VOC ⁵	
Continuous During Operation	scf/hr	scf/hr	scf/hr	lb/hr	lb/hr	ton/yr	ton/yr	ton/yr	ton/yr	
Pneumatic Actuator (Total for number of units)	63.00	58.75	0.62	2.49	0.07	10.89	0.32	272.61	0.42	
Dry Seals (Total for number of units)	180.00	167.85	1.78	7.10	0.21	31.12	0.91	778.89	1.20	
Intermittent During Startup/Shutdown	scf/event	scf/event	scf/event	lb/event	lb/event	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	
Blowdowns (Total for number of units) ^{1,5}	201,378	187,785	1,994	7,949	231	795	23	19,895	30.73	
							Total:	20,946	32.35	

1. Emission rates per event instead of per hour
2. CH₄ and CO₂ emission rates based on 93.25 vol% CH₄ and 0.99 vol% CO₂ 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 0.039 ratio of VOC to methane as calculated from gas composition.

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 Table N-5 - Fugitive Emissions from Leaks - Mars 100 (T01, T02, & T03)

Number of Compressors: 3
 Annual Operating Hours: 8760

Component	Average Number of Leaking Components ¹ / compressor	Emission Factor ² / scf/hr / component	Total Emission Rate (3 compressors)											
			Total	CH ₄ ³	CO ₂ ³	CH ₄ ⁴	CO ₂ ⁴	CH ₄	CO ₂	CO ₂ e ⁵	VOC ⁶			
		scf/hr / component	scf/hr	scf/hr	scf/hr	lb/hr	lb/hr	lb/hr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service														
Valve	0.55	14.84	24.49	22.83	0.24	0.97	0.03	4.23	0.12	105.95	1.64E-01			
Connector	0.62	5.59	10.40	9.70	0.10	0.41	0.01	1.80	0.05	44.99	6.95E-02			
Open-Ended Line	0.16	17.27	8.29	7.73	0.08	0.33	0.01	1.43	0.04	35.87	5.54E-02			
Pressure Relief	0.00	39.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00			
Meter	0.00	19.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00			
Non-Compressor Service														
Valve	0.60	6.42	11.56	10.78	0.11	0.46	0.01	2.00	0.06	50.00	7.72E-02			
Connector	0.82	5.71	14.05	13.10	0.14	0.55	0.02	2.43	0.07	60.78	9.39E-02			
Open-Ended Line	0.59	11.27	19.95	18.60	0.20	0.79	0.02	3.45	0.10	86.32	1.33E-01			
Pressure Relief	0.12	2.01	0.72	0.67	0.01	0.03	0.00	0.13	0.00	3.13	4.84E-03			
Meter	0.01	2.93	0.09	0.08	0.00	0.00	0.00	0.02	0.00	0.38	5.88E-04			
							Total:	15.48	0.45	387.43	0.60			

1. Estimated component leaks per compressor based on average measurements throughout the Columbia pipeline system
2. Emission factors from 40 CFR 98 Subpart W Table W-3
3. CH₄ and CO₂ emission rates based on 93.25 vol% CH₄ and 0.99 vol% CO₂ in natural gas
4. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
5. Based on 40 CFR 98 Subpart A Global Warming Potentials
6. Based on a 0.039 ratio of VOC to methane as calculated from gas composition.

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Table N-6 - Waukesha VGF-L36GL Emergency Generator (G1)

Horsepower 880 hp
 Brake Specific Fuel Consumption 7757 Btu/Bhp-hr (HHV)
 Total Heat Input 6.83 MMBtu/hr
 Operating Hours 100 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 0.67 MMscf/yr
 6692.3 scf/hr

Pollutant	Emission Factor		Emission Factor Reference
	g/bhp-hr	lb/MMBtu	
NO _x	2.00		ton/yr 0.19
CO	4.00		0.39
CO _{2e}		117.1	40
PM ₁₀		0.010	3.41E-03
PM _{2.5}		0.010	3.41E-03
VOC	1.00		9.70E-02
SO ₂ (Maximum Hourly)		0.0571	0.39
SO ₂ (Average Annual)		0.000714	2.44E-04
Formaldehyde	0.19		0.37
Total HAPs		0.07340	0.50
			0.02
			0.03

Emission Factor Reference
 NSPS Subpart JJJJ Limitation
 NSPS Subpart JJJJ Limitation
 40 CFR 98 Subpart C
 AP-42 Table 3.2-2 (7/00) - 4SLB
 AP-42 Table 3.2-2 (7/00) - 4SLB
 NSPS Subpart JJJJ Limitation
 20 grains S / 100 scf
 0.25 grains S / 100 scf
 Vendor Data
 AP-42 Table 3.2-2 (7/00) - 4SLB

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 Table N-7 - Process Heater (H1)

Heat Input 0.40 MMBtu/hr
 Operating Hours 8760 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 3.44 MMscf/yr
 392.2 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO _x	100	0.098	0.04	0.17	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.03	0.14	AP-42 Table 1.4-1 (7/98)
CO ₂ e		117.1	47	205	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	2.98E-03	0.01	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	2.98E-03	0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	2.16E-03	0.01	AP-42 Table 1.4-2 (7/98)
SO ₂ (Maximum Hourly)		0.0571	0.02		20 grains S / 100 scf
SO ₂ (Average Annual)		0.000714		1.25E-03	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	2.94E-05	1.29E-04	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	7.41E-04	3.24E-03	AP-42 Table 1.4-3 & 4 (7/98)

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 Table N-8 - Process 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

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)
CO ₂ e		117.1	29	128	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	1.86E-03	0.01	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	1.86E-03	0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	1.35E-03	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		7.82E-04	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	1.84E-05	8.05E-05	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	4.63E-04	2.03E-03	AP-42 Table 1.4-3 & 4 (7/98)

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 Elk River Compressor Station
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Table N-9 - Catalytic Heaters (SH1 - 8 x 0.005 MMBtu/hr, 27 x 0.072 MMBtu/hr, 14 x 0.03 MMBtu/hr)

Total Heat Input 2.40 MMBtu/hr
 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 (49 heaters)	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)
CO ₂ e		117.1	282	1,233	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	0.02	0.08	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	0.02	0.08	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)	0.075	0.00007	1.77E-04	0.01	0.25 grains S / 100 scf
Formaldehyde			4.45E-03	7.74E-04	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185		0.02	AP-42 Table 1.4-3 & 4 (7/98)

Attachment O

Monitoring / Recordkeeping / Reporting / Testing Plans

Monitoring/Recordkeeping/Reporting/Testing Plans

Turbines T01, T02, and T03

To demonstrate compliance with the turbine annual emission rates in the permit, Columbia proposes to maintain the following records:

- 1) Monthly operating hours,
- 2) Monthly operating hours at less than 50% load,
- 3) Monthly operating hours at less than 0 °F ambient temperature, and
- 4) Monthly number of startup and shutdown cycles.

These monthly records will be used in conjunction with the emission factors in Attachment N to calculate monthly emissions and 12-month rolling sums. Monthly emission (ME) for each regulated pollutant (P_x) will be calculated using the following equation:

$$ME_{P_x} = DLN_{P_x} * DLN \text{ hrs} + LL_{P_x} * LL \text{ hrs} + LT_{P_x} * LT \text{ hrs} + SS_{P_x} * SS \text{ cycles}$$

where:

DLN_{P_x} is the unit emission rates (lb/hr) for pollutant X during normal (DLN) operation,
 LL_{P_x} is the unit emission rates (lb/hr) for pollutant X during low-load (LL) operation,
 LT_{P_x} is the unit emission rates (lb/hr) for pollutant X during low-temperature (LT) operation, and
 SS_{P_x} is the unit emission rates (lb/cycle) for pollutant X during startup/shutdown (SS) operation.

The unit emission rates for each pollutant during DLN, LL, LT, and SS operation are summarized in Table N-3 within Attachment N.

At the end of each month, the monthly emissions will be summed for the preceding 12 months to determine compliance with the proposed annual emission limits. The 12-month rolling emissions will be reported to the state as part of the Station's semi-annual monitoring report.

To demonstrate compliance with Subpart KKKK, 40 CFR §60.4400, an initial NO_x performance test using EPA reference methods is required. Therefore, Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NO_x emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be approved for annual turbine testing. In addition, the Station will continuously monitor the turbines to document any periods during which the SoLo NO_x system is not in service (e.g., during startup, shutdown, low-load, or a system malfunction). Records of turbine startup, shutdown, SoLo NO_x malfunction, and/or SoLo NO_x monitoring system malfunction will be recorded per Subpart KKKK and NSPS General Provisions in 40 CFR §60.7(b)&(c). Compliance with the SO_2 and fuel sulfur content limits can be demonstrated by monitoring natural gas sulfur content annually. However, per 40 CFR §60.4365(a), Columbia will exempt the proposed turbines from periodic monitoring by demonstrating compliance with the FERC tariff limit on total sulfur content of 20 grains of sulfur per 100 standard cubic feet.

Emergency Generator G1

Columbia will submit the initial notification as per 40 CFR Part 60 to comply with Subpart JJJ for the emergency generator. Compliance with the 40 CFR 60 Subpart JJJ emission limitations will be demonstrated through the initial and subsequent testing required by the Subpart. Columbia will maintain records of monthly operating hours to demonstrate compliance with the proposed annual emissions limitations. An initial notification is being submitted with this application for the emergency generator in Attachment O.

**Supplemental Attachment:
Emergency Generator Initial Notification**

Initial Notification for 40 CFR 60 NSPS Subpart JJJJ

40 CFR 60.4245(c)

Name of Owner or Operator:	Columbia Gas Transmission
Name of Affected Facility:	Elk River Compressor Station
Address of the Affected Facility:	State Route 4 Clendenin, West Virginia 25045
Engine Information:	
	Make Waukesha
	Model VGF-L36GL
	Engine Family VGF
	Serial Number tbd
	Model Year tbd
	Max Engine Power 880 bhp
	Engine Displacement 2193 cu. Ln.
Any Emission Control Equipment:	None
Fuel Used:	Natural Gas