

May 9, 2016

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

RE: Columbia Gas Transmission, LLC
Ceredo Compressor Station (Facility ID#099-00013)
Construction/Modification Application (45CSR13) and
Significant Modification Application (Revision to Title V)
Permit No. R30-09900013-2012

Dear Mr. Durham,

Columbia Gas Transmission, LLC (Columbia) owns and operates the Ceredo Compressor Station, located in Wayne County, West Virginia. This modification application consists of a Regulation 13 application package requesting the installation of one new natural gas-fired Solar Titan 250 turbine (30,399 hp) to replace two existing turbines (E08 and E09). Additionally, two electric-driven units will be installed (not emissions sources).

The Station's potential to emit (PTE) is over 100 tons per year for nitrogen oxides and carbon monoxide; therefore, the Station will continue to be classified as a major source under Title V regulations. The Project emission rates are less than Prevention of Significant Deterioration (PSD) significant emission levels.

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

Although the proposed turbine is subject to 40 CFR 63, Subpart YYYY – National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion Turbines, there is a stay of standards for gas-fired turbines, except for an initial notification. Therefore, the fee for NESHAP applicability is not included. This preconstruction permit application will satisfy the initial notification requirement.

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. Ivey
Principal Air
Columbia Pipeline Group

Attachments

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APPLICATION FOR 45 CSR 13
CONSTRUCTION PERMIT
AND
TITLE V PERMIT MODIFICATION

Columbia Gas Transmission, LLC
Ceredo Compressor Station
Wayne County, West Virginia
Title V Permit No. R30-09900013-2012

May 2016



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): Ceredo 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: 1664 Walkers Branch Road Huntington, WV 25704	
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 <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – If YES, please explain: Application is for modification of existing natural gas compressor station which Columbia Gas owns and operates. – 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): 099-00013		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R30-09900013-2012, R13-1856	
All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.			

12A. <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. Traveling I-64 West from Charleston, take the Kenova-Ceredo exit. Turn left onto Route 52. Make a left onto Airport Road. Turn right onto Walker's Branch Road at the Pilgrim Glass Plant, and travel 2 miles; the station is on the left. 		
12.B. New site address (if applicable):	12C. Nearest city or town: Huntington	12D. County: Wayne
12.E. UTM Northing (KM): 4,247.7	12F. UTM Easting (KM): 366.1	12G. UTM Zone: 17
13. Briefly describe the proposed change(s) at the facility: Installation of one Solar Titan 250 turbine to replace the existing turbines E08 and E09.		
14A. Provide the date of anticipated installation or change: 10/1/2017 <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: / / 		14B. Date of anticipated Start-Up if a permit is granted: 11/1/2018
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).		
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		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
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.		
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 .		

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).
20. Include a Table of Contents as the first page of your application package.
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 Plot Plan Guidance) . <ul style="list-style-type: none"> Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).
22. Provide a Detailed Process Flow Diagram(s) showing each proposed or modified emissions unit, emission point and control device as Attachment F .
23. Provide a Process Description as Attachment G . <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).
<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>
24. Provide Material Safety Data Sheets (MSDS) for all materials processed, used or produced as Attachment H . <ul style="list-style-type: none"> 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 .												
<p>28. Check all applicable Emissions Unit Data Sheets listed below:</p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Bulk Liquid Transfer Operations</td> <td><input type="checkbox"/> Haul Road Emissions</td> <td><input type="checkbox"/> Quarry</td> </tr> <tr> <td><input type="checkbox"/> Chemical Processes</td> <td><input type="checkbox"/> Hot Mix Asphalt Plant</td> <td><input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities</td> </tr> <tr> <td><input type="checkbox"/> Concrete Batch Plant</td> <td><input type="checkbox"/> Incinerator</td> <td><input type="checkbox"/> Storage Tanks</td> </tr> <tr> <td><input type="checkbox"/> Grey Iron and Steel Foundry</td> <td><input type="checkbox"/> Indirect Heat Exchanger</td> <td></td> </tr> </table> <p><input checked="" type="checkbox"/> General Emission Unit, specify One natural gas-fired turbine</p> <p>Fill out and provide the Emissions Unit Data Sheet(s) as Attachment L.</p>	<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	
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<p>29. Check all applicable Air Pollution Control Device Sheets listed below:</p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Absorption Systems</td> <td><input type="checkbox"/> Baghouse</td> <td><input type="checkbox"/> Flare</td> </tr> <tr> <td><input type="checkbox"/> Adsorption Systems</td> <td><input type="checkbox"/> Condenser</td> <td><input type="checkbox"/> Mechanical Collector</td> </tr> <tr> <td><input type="checkbox"/> Afterburner</td> <td><input type="checkbox"/> Electrostatic Precipitator</td> <td><input type="checkbox"/> Wet Collecting System</td> </tr> </table> <p><input type="checkbox"/> Other Collectors, specify</p> <p>Fill out and provide the Air Pollution Control Device Sheet(s) as Attachment M.</p>	<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			
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<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System										
30. Provide all Supporting Emissions Calculations as Attachment N , or attach the calculations directly to the forms listed in Items 28 through 31.												
<p>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.</p> <p>➤ 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.</p>												
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.												
<p>33. Business Confidentiality Claims. Does this application include confidential information (per 45CSR31)?</p> <p style="text-align: center;"><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>➤ 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.</p>												
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: Delegation of Authority Letter provided in lieu of Authority Form												
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Authority of Corporation or Other Business Entity</td> <td style="width: 50%; border: none;"><input type="checkbox"/> Authority of Partnership</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Authority of Governmental Agency</td> <td style="border: none;"><input type="checkbox"/> Authority of Limited Partnership</td> </tr> </table>	<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								
<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 .												
<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>												

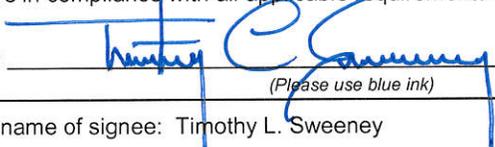
35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

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  DATE: 4-25-2016
(Please use blue ink) (Please use blue ink)

35B. Printed name of signee: Timothy L. Sweeney		35C. Title: Manager of Operations
35D. E-mail: tsweeney@cpg.com	36E. Phone: 304-722-8486	36F. FAX: 304-722-8420
36A. Printed name of contact person (if different from above): Lacey 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:

- | | |
|---|---|
| <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attachment A: Business Certificate <input checked="" type="checkbox"/> Attachment B: Map(s) <input checked="" type="checkbox"/> Attachment C: Installation and Start Up Schedule <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion <input checked="" type="checkbox"/> Attachment E: Plot Plan <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s) <input checked="" type="checkbox"/> Attachment G: Process Description <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) <input checked="" type="checkbox"/> Attachment I: Emission Units Table <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s) <input type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s) <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans <input checked="" type="checkbox"/> Attachment P: Public Notice <input type="checkbox"/> Attachment Q: Business Confidential Claims <input checked="" type="checkbox"/> Attachment R: Authority Forms <input checked="" type="checkbox"/> Attachment S: Title V Permit Revision Information <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



Traveling I-64 West from Charleston, take the Kenova-Ceredo exit. Turn left onto Route 52. Make a left onto Airport Road. Turn right onto Walker's Branch Road at the Pilgrim Glass Plant and travel 2 miles; station is on the left.

Attachment B

Date: April 2016

Facility Map
Ceredo Compressor Station

Attachment C

Installation and Start Up Schedule

Installation and Start Up Schedule

Emission Point	Change	Effective date of change	Start Up Date
E08 – GE 3912R Turbine	Retirement	October 2017	
E09 – GE 3112R Turbine	Retirement	October 2018	
E10 – 30,399 hp Solar Turbines Titan 250 Turbine	Installation	October 2017	November 2018
G4 – 880-hp Waukesha Emergency Generator	Installation	October 2017	November 2018
H2 – 1.00 MMbtu/hr Heater	Installation	October 2017	November 2018

Attachment D

Regulatory Discussion

1.0 INTRODUCTION

1.1 Summary and Conclusions

Columbia Gas Transmission, LLC (Columbia) operates the Ceredo Compressor Station (the “Station”) under Title V Permit No. R30–09900013-2012. Columbia is replacing two existing compressor turbines with one (1) new Solar Turbines Titan 250 turbine. These equipment changes (the “Project”) are scheduled to begin in October 2017. This application package contains Columbia’s application to:

- Add one (1) new 30,399-horsepower (hp) Solar Turbines Titan 250 turbine;
- Remove the existing General Electric 3912R turbine (E08);
- Remove the existing General Electric 3112R turbine (E09);
- Add one (1) new 880-hp Waukesha emergency generator;
- Add one (1) new process heater (1.0 million British thermal units per hour [MMBtu/hr]); and
- Modify the Station’s Title V permit to reflect these changes.

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 existing Station and proposed Project are 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 Existing Facility

Columbia's Ceredo Compressor Station is located in Wayne County, West Virginia, near the town of Huntington. The Station receives natural gas via pipeline from an upstream compressor station, compresses it using natural gas-fired turbines and reciprocating internal combustion engines (RICE), and transmits it via pipeline to a downstream station. The Station is covered by Standard Industrial Classification (SIC) 4922 and operates under Title V Permit No. R30-09900013-2012. The Station has the potential to operate seven (7) days per week, twenty-four (24) hours per day.

The Station currently operates seven (7) RICE and two natural gas-fired turbines, including:

- Six (6) 2,800-hp natural gas-fired, Cooper-Bessemer GMWH-8, two-cycle, lean-burn RICE with installation dates in 1954 (3 units), 1957, 1958, and 1960;
- One (1) 2,700-hp natural gas-fired, Cooper-Bessemer 8V-250, two-cycle, lean-burn RICE with installation date in 1965;
- One (1) 10,200-hp natural gas-fired, General Electric 3912R compressor turbine with installation date in 1971; and
- One (1) 12,500-hp natural gas-fired, General Electric 3112R compressor turbine with installation date in 1996.

Auxiliary equipment at the Station includes one (1) 738-hp natural gas-fired Waukesha emergency generator, one (1) 0.35-million British thermal units per hour (MMBtu/hr) natural gas-fired fuel gas heater, one (1) 6.276-MMBtu/hr natural gas-fired boiler, and numerous storage tanks for various low vapor pressure liquids.

A plot plan of the Station is provided as Attachment E.

Based on the current annual potential to emit (PTE) oxides of nitrogen (NO_x) and carbon monoxide (CO) as presented in Table N-1 of Attachment N, the existing Station is classified as a major source under New Source Review (NSR) regulations. Also provided in Table N-1 are the current potential emissions of volatile organic compounds (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), respirable 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. The existing Station is a major source of HAPs.

Wayne County is classified as attainment or unclassifiable for all National Ambient Air Quality Standards. It is a maintenance area for the 1997 8-hour ozone and annual PM_{2.5} standards. There are no Class I areas located within 100 kilometers of the Station.

2.2 Proposed Modification

The proposed Solar Turbines Titan 250 turbine is designated Emission Point ID E10. Attachment F includes a process flow diagram showing the existing and Project equipment.

The new Solar Turbines will be equipped with advanced dry-low-NO_x combustion controls, known by the manufacturer as SoLoNO_x. These controls reduce 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 40% to 100% of full load. During operation at low turbine loads (<40% of full load), low ambient temperatures (<-20 °F), and during turbine startup and shutdown, supplemental pilot fuel is fired for flame stability and results in NO_x, CO, and VOC concentrations that are higher than during SoLoNO_x operation. Estimated emissions during each of the operating modes are summarized in Attachment N with the turbine calculations.

The new Solar Turbines Titan 250 turbine is expected to continuously operate, therefore emission estimates are based on 8,760 operating hours per year. Because the SoLoNO_x controls cannot operate properly at very low ambient temperatures (below -20 °F) or below 40% of peak load, the potential emission estimates presented in Table N-3 include operating hours at: (1) low load (less than 40% load), and (2) startup/shutdown cycles. Operation at very low ambient temperature is not expected. Annual emissions from the proposed turbine 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 (1) 880-hp Waukesha natural gas-fired emergency generator for which potential emissions are based on operation of up to 500 hours per year. Potential emissions from this unit are based on NSPS Subpart JJJJ emission limitations for NO_x, CO, and VOC, and AP-42 emission factors for other air pollutants. The Station will also be installing one process heater rated at 1.0 MMBtu/hr. Potential emissions from this unit are based on AP-42 emission factors.

Potential annual emissions from all sources associated with the Project are provided in Table N-1 of Attachment N, and source-specific emissions calculations are also provided in Attachment N.

No other changes in Station equipment are currently being proposed. The target date for starting construction is October 2017. Initial commercial operation is scheduled for November 2018.

2.3 Contemporaneous Equipment Changes

In 2012, a 6.276 MMBtu/hr natural gas-fired boiler (BLR2) was installed to replace a 6.84-MMBtu/hr boiler (BLR1). This change was prior to the contemporaneous period for the Project. There have not been in any other changes in station equipment; the only contemporaneous equipment changes are those associated with this Project.

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. The Station is a major source under PSD rules per §45-14-2.43. For a major stationary source such as the existing Station, PSD requirements apply to projects that have the potential to increase annual emissions beyond defined significance levels. This potential is evaluated as a two-step process. First, any emissions increase associated with the project itself is evaluated. If the project will result in a significant emissions increase (as defined at §45-14-2.74 and -2.75), then the net emissions increase, considering all contemporaneous equipment changes must be evaluated based on the definition of net emissions increase at §45-14-2.46.

Per §45-14-2.80.e.1, beginning July 1, 2011, new major stationary sources with the potential to emit greater than or equal to 100,000 tpy of CO₂e 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, CO₂e emissions are no longer considered for PSD applicability.

Emissions calculations for the PSD applicability analysis are provided in Attachment N, and potential annual emissions associated with the Project are summarized in Table N-1. Project-related emissions of all PSD-regulated pollutants are below the PSD significant emission increase thresholds; therefore, PSD is not applicable to emissions increases at Step 1 of the PSD applicability procedure.

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. This section describes requirements that apply to the proposed units.

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 heater will be rated at 1.0 MMBtu/hr, this NSPS is not applicable.

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. The proposed 30,399-hp Solar Turbines Titan 250 turbine, has a peak heat input of 10 MMBtu/hr or greater and 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 the proposed turbine is presented in Table 3-1.

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

Unit	Table 1 subcategory	Heat input	NO _x Emission Standard	Manufacturer's Warranty
Solar Turbines Titan 250 (E10)	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 rate 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 turbine is not operated at full load. 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. In addition, Columbia will continuously monitor the turbine 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).

Columbia will use the FERC tariff to show compliance with the SO₂ and fuel sulfur limits per 40 CFR §60.4365(a).

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.

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

- 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.

The proposed emergency generator will be subject to the Subpart JJJJ emission limits for engines greater than 130 hp. In accordance with 40 CFR §60.4243(a)(2)(iii), since this engine is not certified, an initial performance test is required within one year of startup. Subsequent performance testing is required every 8,760 hours of operation or every three years, whichever comes first. 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 Station is classified as a major source of HAP emissions and will remain so after the Project.²

3.3.1 Stationary Combustion Turbines (40 CFR 63 Subpart YYYY)

As a major source of HAPs, the proposed turbine is subject to the NESHAP for stationary combustion turbines promulgated under 40 CFR 63 Subpart YYYY. Per 40 CFR §63.6095(d), there is a stay of standards for lean premix gas-fired stationary combustion turbines until EPA takes final action to require compliance with this subpart. The only requirement for the new turbine at the Station is to comply with the initial notification requirements in 40 CFR §63.6145. This preconstruction permit application will satisfy the initial notification requirement.³

3.3.2 Stationary Reciprocating Internal Combustion Engines (40 CFR 63 Subpart ZZZZ)

The proposed emergency generator is subject to the NESHAP for stationary RICE. The proposed engine is an 880-hp emergency generator which will not, and is not contractually obligated to, be available for more than 15 hours per calendar year for emergency demand response programs and voltage deviation as described in 40 CFR 63.6640(f)(2)(ii) and (iii). As a new emergency stationary RICE with a site rating greater than 500 brake horsepower at a major source of HAPs which does not operate for these purposes, the proposed engine does not have to meet the requirements of Subpart ZZZZ and Subpart A except for the initial notification requirements in 40 CFR 63.6645(f). This preconstruction permit application will satisfy the initial notification requirement.⁴

3.3.3 Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters (40 CFR 63 Subpart DDDDD)

The Station is also subject to NESHAP for Industrial, Commercial, and Institutional (ICI) Boilers and Process Heaters promulgated under 40 CFR 63 Subpart DDDDD, which applies to existing and new ICI boilers at major sources of HAPs. The new process heater is a new affected source (gas 1 subcategory) per Subpart DDDDD and is less than 5 MMBtu/hr heat input. As such, it is not subject to Subpart DDDDD emissions limitations but is subject to tune-ups every five years (per 40 CFR §63.7500(e)). This preconstruction permit application will satisfy the initial notification requirement.⁵

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

³ Per 40 CFR §63.9(b)(1)(iii)

⁴ Per 40 CFR §63.9(b)(1)(iii)

⁵ Per 40 CFR §63.9(b)(1)(iii)

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

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., process heater) is 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 turbine and emergency generator are not considered fuel-burning units per the definition in §45-10-2. 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 heater, 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 neither the potential increase in emissions nor the net emissions increase from the Project exceeds PSD significance levels, the Project is not classified as major for PSD purposes and is subject to the permitting requirements in 45 CSR 13. This document contains the information required by this permitting program.

3.8 Requirements for Operating Permits (45 CSR 30)

After this Project, the Ceredo Compressor Station will continue to be classified as a major source under Title V regulations. A significant modification application to revise the Station's Title V permit is being submitted to WVDAQ as part of the application package.

Attachment E
Plot Plan

Legend

-  Fence Line
-  New Emission Point
-  Existing Emission Points
-  New Buildings
-  Existing Buildings



Attachment E

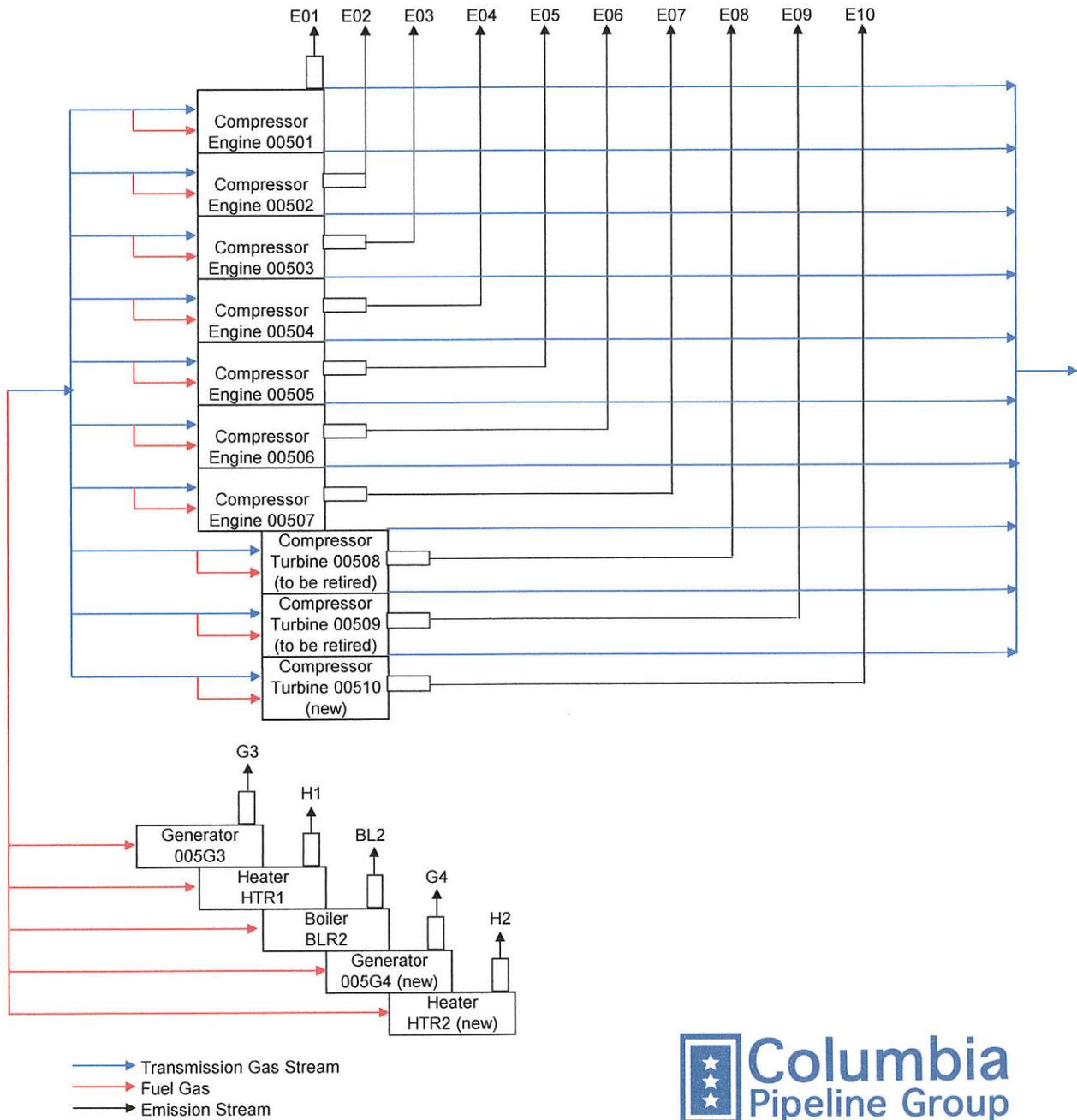
Date: February 2016

Plot Plan
 Ceredo Compressor Station

Attachment F

Detailed Process Flow Diagram

ATTACHMENT F CEREDO COMPRESSOR STATION PROCESS FLOW DIAGRAM



Attachment G

Process Description

Process Description

Pipeline transmission of natural gas requires that the gas be compressed. At the Ceredo Compressor Station, two natural gas-fired turbines are used to drive centrifugal gas compressors and seven reciprocating engines (RICE) are used to drive reciprocating gas compressors. This Project will replace the two existing turbines (E08 and E09) with a new Solar Titan 250 turbine-driven compressor (30,399 hp). There will also be an 880 hp Waukesha Emergency Generator installed. 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 Titan 250 turbine at ambient temperatures ≥ -20 °F and at loads $\geq 40\%$, this DLN system is able to limit the exhaust gas concentration of these pollutants (corrected to 15% O₂) to 11 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). Operation at ambient temperatures of less than -20 °F is not expected. At turbine loads $< 40\%$, additional pilot fuel and air flow are required to maintain flame stability and turbine responsiveness. Such low-load operation changes estimated emission concentrations to 50 ppm NO_x, 25 ppm CO, and 20 ppm UHC (4 ppm VOC). Should loads drop below 40%, Columbia will make every effort to either: (1) bring the load back above 40%, (2) shut another unit down and move that volume to the turbine, or (3) 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. Start/up shutdown cycles are limited to 100 cycles per year. For a Solar Titan 250 turbine, the startup sequence takes less than 10 minutes to complete prior to engaging the DLN system. The shutdown sequence for a Solar Titan 250 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 H

SDSs

No new processes or chemicals will be added to the compressor station as a result of this project. Therefore, the Department can continue to rely on the SDS package submitted with the prior 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
00501	E01	Cooper-Bessemer GMWH-8 Compressor Engine	1954	2,800 HP	Existing, remains in service	-
00502	E02	Cooper-Bessemer GMWH-8 Compressor Engine	1954	2,800 HP	Existing, remains in service	-
00503	E03	Cooper-Bessemer GMWH-8 Compressor Engine	1954	2,800 HP	Existing, remains in service	-
00504	E04	Cooper-Bessemer GMWH-8 Compressor Engine	1957	2,800 HP	Existing, remains in service	-
00505	E05	Cooper-Bessemer GMWH-8 Compressor Engine	1958	2,800 HP	Existing, remains in service	-
00506	E06	Cooper-Bessemer GMWH-8 Compressor Engine	1960	2,800 HP	Existing, remains in service	-
00507	E07	Cooper-Bessemer 8V-250 Compressor Engine	1965	2,700 HP	Existing, remains in service	-
00508	E08	General Electric 3912R Compressor Turbine	1967	10,200 HP	To be retired, 2017	-
00509	E09	General Electric 3112R Compressor Turbine	1971	12,500 HP	To be retired, 2017	-
00510	E10	Solar Titan 250 Combustion Turbine	2017	30,399 HP @ 32 °F	New, 2017	-
005G3	G3	Waukesha F3521GL Emergency Generator	1996	738 HP	Existing, remains in service	-
005G4	G4	Waukesha VGF L36GL Emergency Generator	2017	880 HP	New, 2017	-
HTR1	H1	Total Energy Resources, Inc. Fuel Gas Heater	1998	0.35 MMBtu/hr	Existing, remains in service	-
BLR2	BL2	Hurst S-4-G-150-15 Heating Boiler	2012	6.276 MMBtu/hr	Existing, remains in service	-
HTR2	H2	Heater	2017	1.0 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			
E01	Upward vertical stack	00501						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			Gas	EE	
E02	Upward vertical stack	00502						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			Gas	EE	
E03	Upward vertical stack	00503						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			Gas	EE	
E04	Upward vertical stack	00504						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			Gas	EE	
E05	Upward vertical stack	00505						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			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			
E06	Upward vertical stack	00506						NO _x	247.02	491.79			Gas	EE	
								CO	17.65	35.08			Gas	EE	
								VOC	3.10	12.36			Gas	EE	
								SO ₂	1.48	0.07	-	-	Gas	EE	
								PM	1.25	4.98			Solid	EE	
								CH ₂ O	1.43	5.69			Gas	EE	
E07	Upward vertical stack	00507						NO _x	297.00	591.30			Gas	EE	
								CO	19.63	39.03			Gas	EE	
								VOC	2.78	11.07			Gas	EE	
								SO ₂	1.32	0.07	-	-	Gas	EE	
								PM	1.12	4.46			Solid	EE	
								CH ₂ O	1.28	5.09			Gas	EE	
E08	Upward vertical stack	00508						NO _x	194.21	265.82			Gas	EE	
								CO	14.38	19.70			Gas	EE	
								VOC	0.32	0.86			Gas	EE	
								SO ₂	8.57	0.29	-	-	Gas	EE	
								PM	0.99	2.71			Solid	EE	
								CH ₂ O	0.11	0.29			Gas	EE	
E09	Upward vertical stack	00509						NO _x	193.80	265.54			Gas	EE	
								CO	15.08	41.28			Gas	EE	
								VOC	0.39	1.06			Gas	EE	
								SO ₂	10.51	0.36	-	-	Gas	EE	
								PM	1.21	3.32			Solid	EE	
								CH ₂ O	0.13	0.36			Gas	EE	
E10	Upward vertical stack	00510						NO _x	7.93	35.67			Gas	EE	
								CO	12.06	54.65			Gas	EE	
								VOC	1.38	6.03			Gas	EE	
								SO ₂	12.71	0.70	-	-	Gas	EE	
								PM	1.47	6.44			Solid	EE	
								CH ₂ O	0.16	0.69			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			
G3	Upward vertical stack	005G3						NO _x	2.44	0.61			Gas	EE	
								CO	4.31	1.08			Gas	EE	
								VOC	1.63	0.41			Gas	EE	
								SO ₂	0.34	0.001	-		Gas	EE	
								PM	0.06	0.01			Solid	EE	
								CH ₂ O	0.31	0.08			Gas	EE	
G4	Upward vertical stack	005G4					NO _x	3.88	0.97			Gas	EE		
							CO	7.76	1.94			Gas	EE		
							VOC	1.94	0.49			Gas	EE		
							SO ₂	0.39	0.001	-		Gas	EE		
							PM	0.07	0.02			Solid	EE		
							CH ₂ O	0.37	0.09			Gas	EE		
H1		HTR1					NO _x	0.03	0.15			Gas	EE		
							CO	0.03	0.13			Gas	EE		
							VOC	0.002	0.01			Gas	EE		
							SO ₂	0.02	0.001	-		Gas	EE		
							PM	0.003	0.01			Solid	EE		
							CH ₂ O	0.00003	0.0001			Gas	EE		
H2		HTR2					NO _x	0.10	0.43			Gas	EE		
							CO	0.08	0.36			Gas	EE		
							VOC	0.005	0.02			Gas	EE		
							SO ₂	0.06	0.003	-		Gas	EE		
							PM	0.007	0.03			Solid	EE		
							CH ₂ O	0.00007	0.0003			Gas	EE		
BL2		BLR2					NO _x	0.62	2.69			Gas	EE		
							CO	0.52	2.26			Gas	EE		
							VOC	0.03	0.15			Gas	EE		
							SO ₂	0.36	0.02	-		Gas	EE		
							PM	0.05	0.20			Solid	EE		
							CH ₂ O	0.0005	0.002			Gas	EE		

Attachment J EMISSION POINTS DATA SUMMARY SHEET

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.

- 1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- 2 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).
- 3 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.
- 4 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).
- 5 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).
- 6 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).
- 7 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.)	Exit Gas		Emission Point Elevation (ft)			UTM Coordinates (km)	
		Temp. (°F)	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
E01	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E02	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E03	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E04	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E05	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E06	2.58	600	22,041	70.3	577	57.83	4,247.8	366.1
E07	2.58	600	19,735	63.0	577	57.83	4,247.8	366.1
E08	10.0	1,000	47,492	9.9	577	51.0	4,247.8	366.1
E09	11.0	800	238,437	41.8	577	57.0	4,247.8	366.1
E10	10.7 ³	830 ⁴	326,898 ⁴	60.4 ⁴	575	55.0	4,247.8	366.1
G3	1.0	900	4,010	85.1	577	23.0	4,247.8	366.1
G4		841	4,643		577		4,247.8	366.1
H1	0.67				577	15.0	4,247.8	366.1
H2					577		4,247.8	366.1
BL2					577		4,247.8	366.1

¹ Give at operating conditions. Include inerts.
² Release height of emissions above ground level.
³ Effective diameter based on 114" square duct.
⁴ Based on operation at 32 °F.

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 <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. See Attached PTE calculations.	
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	4.81 0.06 120.27	Does not apply	4.81 0.06 120.27	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).

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*): 00510

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

Solar Turbines Titan 250 turbine. Proposed emission point ID E10.

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:

1,912.3 million cubic feet per year (equivalent to 1,950,554 MMBtu/yr) for Turbine E10.

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

Methane 86.9 All values in volume percent.

Ethane 11.7203

Propane 0.3553

I-Butane 0.0215

N-Butane 0.0334

I-Pentane 0.0098

N-Pentane 0.0071

Hexane 0.0147

Carbon Dioxide 0.4256 Nitrogen 0.5123 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:

222.67 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: 222.67 × 10⁶ BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52
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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		7.93	lb/hr	grains/ACF
b. SO ₂		12.71	lb/hr	grains/ACF
c. CO		12.06	lb/hr	grains/ACF
d. PM ₁₀		1.47	lb/hr	grains/ACF
e. Hydrocarbons		6.91	lb/hr	grains/ACF
f. VOCs		1.38	lb/hr	grains/ACF
g. Pb		0	lb/hr	grains/ACF
h. Specify other(s)				
CO ₂ e		26,074	lb/hr	grains/ACF
Formaldehyde		0.16	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 40% load,
- 3) Monthly operating hours at less than or equal to -20 °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. Facility will follow same reporting requirements as currently being conducted. Performance test reports 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 turbine is not operated at full load. 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.

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 40 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*): 005G4

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

880-hp Waukesha Emergency Generator. Proposed emission point ID G4.

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:		
Natural gas at a designed fuel usage of 6,692 scf/hr		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:		
Methane 86.9 All values in volume percent.		
Ethane 11.7203		
Propane 0.3553		
I-Butane 0.0215		
N-Butane 0.0334		
I-Pentane 0.0098		
N-Pentane 0.0071		
Hexane 0.0147		
Carbon Dioxide 0.4256 Nitrogen 0.5123 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 × 10 ⁶ BTU/hr.
7. Projected operating schedule: 500 Hours/year		
Hours/Day	Days/Week	Weeks/Year

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 reports 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*): HTR2

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

1.0 MMbtu/hr Process heater. Proposed emission point ID H2.

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:			
Natural gas at a designed fuel usage of 980.4 scf/hr			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:			
Methane 86.9 All values in volume percent.			
Ethane 11.7203			
Propane 0.3553			
I-Butane 0.0215			
N-Butane 0.0334			
I-Pentane 0.0098			
N-Pentane 0.0071			
Hexane 0.0147			
Carbon Dioxide 0.4256 Nitrogen 0.5123 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:			
1.00 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:		1.00	× 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	0.10	lb/hr	grains/ACF
b. SO ₂	0.06	lb/hr	grains/ACF
c. CO	0.08	lb/hr	grains/ACF
d. PM ₁₀	0.007	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.005	lb/hr	grains/ACF
g. Pb	0	lb/hr	grains/ACF
h. Specify other(s)			
CO _{2e}	117	lb/hr	grains/ACF
Formaldehyde	0.00007	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. This should be considered an insignificant activity.

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
 Cerdo Compressor Station
 May 2016
 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				
New Sources PTE¹													
E10 - Solar Titan 250 Turbine	30,399 hp (32 °F)	37.07	56.95	121,934	6.49	10.83	0.70	0.78	1.13				
G4 - Waukesha Emergency Generator	880 hp	35.67	54.65	114,203	6.44	6.03	0.70	0.69	1.00				
H2 - Process Heater	1.00 MMBtu/hr	0.97	1.94	200	0.02	0.49	1.22E-03	0.09	0.13				
Equipment Leaks (fugitive emissions) ²		0.43	0.36	513	0.03	0.02	3.13E-03	3.22E-04	8.11E-03				
Venting (except blowdowns)				120		0.07							
Blowdowns				326		0.20							
				6,692		4.10							
Current PTE		4,077	313.93	193,863	40.59	87.73	1.18	39.94	57.60				
E01 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E02 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E03 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E04 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E05 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E06 - Cooper-Bessemer GMWH-8 Engine	2,800 hp	491.79	35.08	12,063	4.98	12.36	0.07	5.69	8.19				
E07 - Cooper-Bessemer 8V-250 Engine	2,700 hp	591.30	39.03	10,801	4.46	11.07	0.07	5.09	7.34				
E08 - General Electric 3912R Turbine	10,200 hp	265.82	19.70	48,130	2.71	0.86	0.29	0.29	0.42				
E09 - General Electric 3112R Turbine	12,500 hp	265.54	41.28	58,982	3.32	1.06	0.36	0.36	0.52				
G3 - Waukesha Emergency Generator	738 hp	0.61	1.08	173	0.01	0.41	1.05E-03	0.08	0.11				
H1 - Fuel Gas Heater	0.35 MMBtu/hr	0.15	0.13	180	0.01	0.01	1.09E-03	1.13E-04	2.84E-03				
BL2 - Heating System Boiler	6.28 MMBtu/hr	2.69	2.26	3,219	0.20	0.15	0.02	0.002	0.05				
Changes to Current PTE		-531.36	-60.98	-107,112	-6.04	-1.92	-0.65	-0.65	-0.94				
E08 - General Electric 3912R Turbine ³	10,200 hp	-265.82	-19.70	-48,130	-2.71	-0.86	-0.29	-0.29	-0.42				
E09 - General Electric 3112R Turbine ⁴	12,500 hp	-265.54	-41.28	-58,982	-3.32	-1.06	-0.36	-0.36	-0.52				
Change in PTE (new + changes)		-494.29	-4.04	14,822	0.45	8.91	0.05	0.14	0.19				
Proposed PTE¹		3,583	310	208,686	41.03	96.64	1.23	40.08	57.79				
Project PTE^{1,5}		37.1	56.9	121,934	6.49	10.83	0.70	0.78	1.13				
PSD Significance Threshold		40	100		15 / 10	40	40						

1. Excludes fugitive emissions (compressor stations are not one of the named source categories that include fugitive emissions). PTE = potential to emit.
2. Fugitive emissions are not part of the PSD or Title V applicability analyses.
3. Will be taken out of service as part of Leach Xpress Project and will be removed as part of Mountaineer Xpress Project.
4. Will be taken out of service and removed as part of Mountaineer Xpress Project.
5. For comparison to PSD significance thresholds

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
 May 2016

Table N-2 - Solar Titan 250 Turbine (E10)

Horsepower 30,399 hp (32 °F)
 Brake Specific Fuel Consumption 6,599 Btu/bhp-hr (LHV, 32 °F)
 Total Heat Input 200.60 MMBtu/hr (LHV, 32 °F)
 222.67 MMBtu/hr (HHV, 32 °F)³
 Operating Hours 8760 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 1,912.31 MMscf/yr
 218,300.0 scf/hr (based on 32 °F)

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	ppmvd@15%O2	lb/MMBtu	lb/hr ¹	ton/yr ²	
NO _x	10.00	0.039 LHV	7.93	35.67	Vendor Data
CO	25.00	0.060 LHV	12.06	54.65	Vendor Data
GHG (CO ₂ e)		117.1 HHV	26,074	114,203	40 CFR 98 Subpart C
PM ₁₀		0.0066 HHV	1.47	6.44	AP-42 Table 3.1-2a (4/00)
PM _{2.5}		0.0066 HHV	1.47	6.44	AP-42 Table 3.1-2a (4/00)
VOC	5.00	0.007 LHV	1.38	6.03	Vendor Data (20% of UHC) ⁴
SO ₂ (Maximum Hourly)		0.0571 HHV	12.71		20 grains S / 100 scf
SO ₂ (Average Annual)		0.000714 HHV		0.70	0.25 grains S / 100 scf
Formaldehyde		0.00071 HHV	0.16	0.69	AP-42 Table 3.1-3 (4/00)
Total HAPs		0.00102 HHV	0.23	1.00	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 maximum of: (1) normal operation or (2) normal operation plus non-SoLoNox operation.
3. HHV heat input based on HHV=1.11*LHV
4. VOC based on 20% of vendor data for unburned hydrocarbon.

Table N-3 - Solar Titan 250 (E-10) - Normal and Non-SoLoNOx Emission Rates

Normal and Non-SoLoNOx Emission Rates

Operating Mode	Units	NO _x	CO	VOC
Normal Load @ 32 °F ¹	lb/hr	7.93	12.06	1.38
Normal Load @ 32 °F ²	tpy	34.73	52.82	6.05
Non-SoLoNOx Operation ³	tpy	0.94	1.82	-0.03
Total Emissions per Turbine	tpy	35.67	54.65	6.03

1. Based on data from Solar Titan 250 Compressor Set data sheet and the following concentrations:
 11 ppm NO_x; 25 ppm CO; 5 ppm VOC
2. Based on 8760 hr/yr of normal operation.
3. Potential emissions in excess of 8760 hr/yr at normal operation that may occur when turbine operates in non-SoLoNOx mode such as during low ambient temperatures (<0 °F), low load (< 50%), and during startup and shutdown events. This annual total represents the difference between the aggregate total with non-SoLoNOx operation and 8760 hr/yr of normal operation.

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
E10 / Solar Titan 250	0.12	0.18	0.02	0.19	0.02	0.002

1. Based on vendor performance data; values in italics based on AP-42 emission factors.
2. VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.
3. Conservatively based on 20 grains sulfur per 100 standard cubic feet of natural gas for maximum short-term emissions.

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
 May 2016

Table N-4 - Emissions from Venting, Blowdowns & Equipment Leaks (Fugitives)

Component	Emission Rate (ton/yr)			
	CH ₄ ¹	CO ₂ ¹	CO ₂ e ²	VOC ³
Venting (except blowdowns)	13.05	0.18	326	0.20
Blowdowns	267.53	3.59	6,692	4.10
Equipment Leaks (Fugitives)	4.81	0.06	120	0.07

1. CH₄ and CO₂ emission rates based on 86.90 vol% CH₄ and 0.43 vol% CO₂ in natural gas
2. Based on 40 CFR 98 Subpart A Global Warming Potentials
3. Based on a 0.0153 ratio of VOC to methane as calculated from gas composition

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Table N-5 - Waukesha VGF-L36GL Emergency Generator (G4)

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

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	g/bhp-hr	lb/MMBtu	lb/hr	ton/yr	
NO _x	2.00		3.88	0.97	NSPS Subpart JJJJ Limitation
CO	4.00		7.76	1.94	NSPS Subpart JJJJ Limitation
CO ₂ e		117.1	799	200	40 CFR 98 Subpart C
PM ₁₀		0.010	0.07	0.02	AP-42 Table 3.2-2 (7/00) - 4SLB
PM _{2.5}		0.010	0.07	0.02	AP-42 Table 3.2-2 (7/00) - 4SLB
VOC	1.00		1.94	0.49	NSPS Subpart JJJJ Limitation
SO ₂ (Maximum Hourly)		0.0571	0.39		20 grains S / 100 scf
SO ₂ (Average Annual)		0.000714		1.22E-03	0.25 grains S / 100 scf
Formaldehyde	0.19		0.37	0.09	Vendor Data
Total HAPs		0.07340	0.50	0.13	AP-42 Table 3.2-2 (7/00) - 4SLB

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
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 Table N-6 - Fuel Gas Heater (H2)

Heat Input 1.00 MMBtu/hr
 Operating Hours 8760 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 8.59 MMscf/yr
 980.4 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO _x	100	0.098	0.10	0.43	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.08	0.36	AP-42 Table 1.4-1 (7/98)
CO ₂ e		117.1	117	513	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	7.45E-03	0.03	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	7.45E-03	0.03	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	5.39E-03	0.02	AP-42 Table 1.4-2 (7/98)
SO ₂ (Maximum Hourly)		0.0571	0.06		20 grains S / 100 scf
SO ₂ (Average Annual)	0.075	0.00007	7.35E-05	3.13E-03	0.25 grains S / 100 scf
Formaldehyde			1.85E-03	3.22E-04	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	1.85E-03	8.11E-03	AP-42 Table 1.4-3 & 4 (7/98)

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
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Table N-7 - 2SLB Reciprocating Compressor Engines (E01 - E06)

Horsepower 2,800 HP
 Maximum Horsepower 3,080 HP
 Brake Specific Fuel Consumption 8,400 Btu/Bhp-hr
 Total Heat Input 23.52 MMBtu/hr
 Max Heat Input 25.87 MMBtu/hr
 Operating Hours 8,760 hr/yr
 Natural Gas Heat Content 1,020 Btu/scf
 Fuel Consumption 202.00 MMscf/yr
 25,365 scf/hr

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Pollutant	Emission Factor		Emission Rate			Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr (per engine)	ton/yr (6 engines)	
NO _x (Maximum Hourly)		8.02E-02	247.02			CGT Test
NO _x (Average Annual)		4.01E-02		491.79	2,951	CGT Test
CO (Maximum Hourly)		5.73E-03	17.65			CGT Test
CO (Average Annual)		2.86E-03		35.08	210	CGT Test
CO ₂ e	117.1		3,030	12,063	72,379	40 CFR 98 Subpart C
PM ₁₀	0.048		1.25	4.98	29.86	AP-42 Table 3.2-1 (7/00) - 2SLB
PM _{2.5}	0.048		1.25	4.98	29.86	AP-42 Table 3.2-1 (7/00) - 2SLB
VOC	0.120		3.10	12.36	74.17	AP-42 Table 3.2-1 (7/00) - 2SLB
SO ₂ (Maximum Hourly)	0.0571		1.48			20 grains S / 100 scf
SO ₂ (Average Annual)	0.000714			0.07	0.44	0.25 grains S / 100 scf
Formaldehyde	0.05520		1.43	5.69	34.12	AP-42 Table 3.2-1 (7/00) - 2SLB
Total HAPs	0.07954		2.06	8.19	49.16	AP-42 Table 3.2-1 (7/00) - 2SLB

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Ceredo Compressor Station
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Table N-8 - 2SLB Reciprocating Compressor Engine (E07)

Horsepower 2,700 HP
 Maximum Horsepower 2,970 HP
 Brake Specific Fuel Consumption 7,800 Btu/Bhp-hr
 Total Heat Input 21.06 MMBtu/hr
 Max Heat Input 23.17 MMBtu/hr
 Operating Hours 8,760 hr/yr
 Natural Gas Heat Content 1,020 Btu/scf
 Fuel Consumption 180.87 MMscf/yr
 22,712 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO _x (Maximum Hourly)		1.00E-01	297.00		CGT Test
NO _x (Average Annual)		5.00E-02		591.30	CGT Test
CO (Maximum Hourly)		6.61E-03	19.63		CGT Test
CO (Average Annual)		3.30E-03		39.03	CGT Test
CO ₂ e	117.1		2,713	10,801	40 CFR 98 Subpart C
PM ₁₀	0.048		1.12	4.46	AP-42 Table 3.2-1 (7/00) - 2SLB
PM _{2.5}	0.048		1.12	4.46	AP-42 Table 3.2-1 (7/00) - 2SLB
VOC	0.120		2.78	11.07	AP-42 Table 3.2-1 (7/00) - 2SLB
SO ₂ (Maximum Hourly)	0.0571		1.32		20 grains S / 100 scf
SO ₂ (Average Annual)	0.000714			0.07	0.25 grains S / 100 scf
Formaldehyde	0.05520		1.28	5.09	AP-42 Table 3.2-1 (7/00) - 2SLB
Total HAPs	0.07954		1.84	7.34	AP-42 Table 3.2-1 (7/00) - 2SLB

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Table N-9 - General Electric 3912R Turbine (E08) - To be Retired

Horsepower 10,200 HP
 Maximum Horsepower 16,320 HP
 Brake Specific Fuel Consumption 9,200 Btu/Bhp-hr
 Total Heat Input 93.84 MMBtu/hr
 Max Heat Input 150.14 MMBtu/hr
 Operating Hours 8,760 hr/yr
 Natural Gas Heat Content 1,020 Btu/scf
 Fuel Consumption 805.92 MMscf/yr
 147,200 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO _x (Maximum Hourly)		1.19E-02	194.21		CGT Test
NO _x (Average Annual)		5.95E-03		265.82	CGT Test
CO (Maximum Hourly)		8.81E-04	14.38		CGT Test
CO (Average Annual)		4.41E-04		19.70	CGT Test
CO ₂ e	117.10		17,582	48,130	40 CFR 98 Subpart C
PM ₁₀	0.0066		0.99	2.71	AP-42 Table 3.1-2a (4/00)
PM _{2.5}	0.0066		0.99	2.71	AP-42 Table 3.1-2a (4/00)
VOC	0.0021		0.32	0.86	AP-42 Table 3.1-2a (4/00)
SO ₂ (Maximum Hourly)	0.0571		8.57		20 grains S / 100 scf
SO ₂ (Average Annual)	0.000714			0.29	0.25 grains S / 100 scf
Formaldehyde	0.00071		0.11	0.29	AP-42 Table 3.1-3 (4/00)
Total HAPs	0.00103		0.15	0.42	AP-42 Table 3.1-3 (4/00)

**Columbia Gas Transmission, LLC
Ceredo Compressor Station
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Table N-10 - General Electric 3112R Turbine (E09) - To be Retired

Horsepower 12,500 HP
 Maximum Horsepower 20,000 HP
 Brake Specific Fuel Consumption 9,200 Btu/Bhp-hr
 Total Heat Input 115.00 MMBtu/hr
 Max Heat Input 184.00 MMBtu/hr
 Operating Hours 8,760 hr/yr
 Natural Gas Heat Content 1,020 Btu/scf
 Fuel Consumption 987.65 MMscf/yr
 180,392 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO _x (Maximum Hourly)		9.69E-03	193.80		CGT Test
NO _x (Average Annual)		4.85E-03		265.54	CGT Test
CO		7.54E-04	15.08	41.28	AP-42 Table 3.1-3 (4/00)
CO ₂ e	117.10		21,546	58,982	40 CFR 98 Subpart C
PM ₁₀	0.0066		1.21	3.32	AP-42 Table 3.1-2a (4/00)
PM _{2.5}	0.0066		1.21	3.32	AP-42 Table 3.1-2a (4/00)
VOC	0.0021		0.39	1.06	AP-42 Table 3.1-2a (4/00)
SO ₂ (Maximum Hourly)	0.0571		10.51		20 grains S / 100 scf
SO ₂ (Average Annual)	0.000714			0.36	0.25 grains S / 100 scf
Formaldehyde	0.00071		0.13	0.36	AP-42 Table 3.1-3 (4/00)
Total HAPs	0.00103		0.19	0.52	AP-42 Table 3.1-3 (4/00)

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
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Table N-11 - Waukesha 4SLB Emergency Generator (G3)

Horsepower 738 hp
 Brake Specific Fuel Consumption 8,000 Btu/Bhp-hr
 Total Heat Input 5.90 MMBtu/hr
 Operating Hours 500 hr/yr
 Natural Gas Heat Content 1,020 Btu/scf
 Fuel Consumption 2.89 MMscf/yr
 5,788 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu	lb/bhp-hr	lb/hr	ton/yr	
NO _x		3.31E-03	2.44	0.61	R13-1856 Permit Limit
CO		5.84E-03	4.31	1.08	R13-1856 Permit Limit
CO ₂ e	117.1		691	173	40 CFR 98 Subpart C
PM ₁₀	0.010		0.06	0.01	AP-42 Table 3.2-2 (7/00) - 4SLB
PM _{2.5}	0.010		0.06	0.01	AP-42 Table 3.2-2 (7/00) - 4SLB
VOC		2.21E-03	1.63	0.41	R13-1856 Permit Limit
SO ₂ (Maximum Hourly)	0.0571		0.34		20 grains S / 100 scf
SO ₂ (Average Annual)	0.000714			1.05E-03	0.25 grains S / 100 scf
Formaldehyde	0.05280		0.31	0.08	AP-42 Table 3.2-2 (7/00) - 4SLB
Total HAPs	0.07220		0.43	0.11	AP-42 Table 3.2-2 (7/00) - 4SLB

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
 May 2016
 Table N-12 - Fuel Gas Heater (H1)

Heat Input 0.35 MMBtu/hr
 Operating Hours 8760 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 3.01 MMscf/yr
 343.1 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO _x	100	0.098	0.03	0.15	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.03	0.13	AP-42 Table 1.4-1 (7/98)
CO ₂ e		117.1	41	180	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	2.61E-03	0.01	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	2.61E-03	0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	1.89E-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)	0.075	0.0007	2.57E-05	1.09E-03	0.25 grains S / 100 scf
Formaldehyde			6.48E-04	1.13E-04	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185		2.84E-03	AP-42 Table 1.4-3 & 4 (7/98)

Columbia Gas Transmission, LLC
 Ceredo Compressor Station
 May 2016

Table N-13 - Heating System Boiler (BL2)

Heat Input 6.276 MMBtu/hr
 Operating Hours 8760 hr/yr
 Natural Gas Heat Content 1020 Btu/scf
 Fuel Consumption 53.90 MMsct/yr
 6152.9 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO _x	100	0.098	0.62	2.69	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.52	2.26	AP-42 Table 1.4-1 (7/98)
CO ₂ e		117.1	735	3,219	40 CFR 98 Subpart C
PM ₁₀	7.6	0.007	0.05	0.20	AP-42 Table 1.4-2 (7/98)
PM _{2.5}	7.6	0.007	0.05	0.20	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.03	0.15	AP-42 Table 1.4-2 (7/98)
SO ₂ (Maximum Hourly)		0.0571	0.36		20 grains S / 100 scf
SO ₂ (Average Annual)		0.000714		0.02	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	4.61E-04	2.02E-03	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	0.01	0.05	AP-42 Table 1.4-3 & 4 (7/98)

Solar Turbines

A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer Columbia Pipeline Group
Job ID Ceredo CS
PD Number 3X131
Run By Nima Bahrami
Date Run 26-Apr-16

Engine Model TITAN 250-30000S Phase 4 CS/MD 59F MATCH	
Fuel Type CHOICE GAS	Water Injection NO
Engine Emissions Data REV. 1.1	

NOx EMISSIONS

CO EMISSIONS

UHC EMISSIONS

1	30167 HP	100.0% Load	Elev. 575 ft	Rel. Humidity 78.0%	Temperature 0 Deg. F
	PPMvd at 15% O2		10.00	25.00	25.00
	ton/yr		34.80	52.97	30.34
	lbm/MMBtu (Fuel LHV)		0.039	0.060	0.035
	lbm/(MW-hr)		0.35	0.54	0.31
	(gas turbine shaft pwr) lbm/hr		7.95	12.09	6.93

2	30399 HP	100.0% Load	Elev. 575 ft	Rel. Humidity 78.0%	Temperature 32.0 Deg. F
	PPMvd at 15% O2		10.00	25.00	25.00
	ton/yr		34.71	52.83	30.26
	lbm/MMBtu (Fuel LHV)		0.039	0.060	0.034
	lbm/(MW-hr)		0.346	0.53	0.30
	(gas turbine shaft pwr) lbm/hr		7.93	12.06	6.91

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst case" anticipated operating conditions specific to the application and the site conditions. Worst case for one pollutant is not necessarily the same for another.
2. Solar's SoLoNOx warranty, for ppm values, is available for greater than -20 deg F, and between 40% and 100% load for gas fuel.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based on the attached fuel composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine operation outside typical warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and formaldehyde.
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) meet the above values within the tolerances quoted. Pricing and schedule impact will be provided upon request.
6. Any emissions warranty is applicable only for steady-state conditions and does not apply during start-up, shut-down, malfunction, or transient event.
7. 10 ppm NOx values are calculated based on "Expected Performance".

Solar Turbines

A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer Columbia Pipeline Group	
Job ID Ceredo CS	PD Number 3X131
Run By Nima Bahrami	Date Run 26-Apr-16
Engine Performance Code REV. 4.17.1.19.11	Engine Performance Data REV. 1.1

Model TITAN 250-30000S Phase 4
Package Type CS/MD
Match 59F MATCH
Fuel System GAS
Fuel Type CHOICE GAS

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	575
Inlet Loss	in H2O	4.5
Exhaust Loss	in H2O	10.0
Accessory on GP Shaft	HP	42.0
		1
		2
Engine Inlet Temperature	deg F	0
Relative Humidity	%	78.0
Driven Equipment Speed	RPM	6459
Specified Load	HP	FULL
Net Output Power	HP	30167
Fuel Flow	mmBtu/hr	200.76
Heat Rate	Btu/HP-hr	6655
Therm Eff	%	38.234
Engine Exhaust Flow	lbm/hr	603829
PT Exit Temperature	deg F	774
Exhaust Temperature	deg F	774

Fuel Gas Composition (Volume Percent)	Methane (CH4)	86.90
	Ethane (C2H6)	11.72
	Propane (C3H8)	0.36
	I-Butane (C4H10)	0.02
	N-Butane (C4H10)	0.03
	I-Pentane (C5H12)	0.0098
	N-Pentane (C5H12)	0.0071
	Hexane (C6H14)	0.0098
	Heptane (C7H16)	0.0049
	Carbon Dioxide (CO2)	0.43
	Nitrogen (N2)	0.51
	Sulfur Dioxide (SO2)	0.0001

Fuel Gas Properties	LHV (Btu/Scf)	991.1	Specific Gravity	0.6218	Wobbe Index at 60F	1256.9
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This performance was calculated with a basic inlet and exhaust system. Special equipment such as low noise silencers, special filters, heat recovery systems or cooling devices will affect engine performance. Performance shown is "Expected" performance at the pressure drops stated, not guaranteed.

SoLoNOx Products: Emissions in Non-SoLoNOx Modes

Leslie Witherspoon
Solar Turbines Incorporated

PURPOSE

Solar's gas turbine dry low NOx emissions combustion systems, known as *SoLoNOx*[™], have been developed to provide the lowest emissions possible during normal operating conditions. In order to optimize the performance of the turbine, the combustion and fuel systems are designed to reduce NOx, CO and unburned hydrocarbons (UHC) without penalizing stability or transient capabilities. At very low load and cold temperature extremes, the *SoLoNOx* system must be controlled differently in order to assure stable operation. The required adjustments to the turbine controls at these conditions cause emissions to increase.

The purpose of this Product Information Letter is to provide emissions estimates, and in some cases warrantable emissions for NOx, CO and UHC, at off-design conditions.

Historically, regulatory agencies have not required a specific emissions level to be met at low load or cold ambient operating conditions, but have asked what emissions levels are expected. The expected values are necessary to appropriately estimate emissions for annual emissions inventory purposes and for New Source Review applicability determinations and permitting.

COLD AMBIENT EMISSIONS ESTIMATES

Solar's standard temperature range warranty for gas turbines with *SoLoNOx* combustion is $\geq 0^{\circ}\text{F}$ (-20°C). The *Titan*[™] 250 is an exception, with a lower standard warranty at $\geq -20^{\circ}\text{F}$ (-29°C). At ambient temperatures below 0°F , many of Solar's turbine engine models are controlled to increase pilot fuel to improve flame stability and emissions are higher. Without the increase in pilot fuel at temperatures below 0°F the engines may exhibit combustor rumble, as operation may be near the lean stability limit.

If a cold ambient emissions warranty is requested, a new production turbine configured with the latest combustion hardware is required. For most models this refers to the inclusion of Cold Ambient Fuel Control Logic.

Emissions warranties are not offered for ambient temperatures below -20°F (-29°C). In addition, cold ambient emissions warranties cannot be offered for the *Centaur*[®] 40 turbine.

Table 1 provides expected and warrantable (upon Solar's documented approval) emissions levels for Solar's *SoLoNOx* combustion turbines. All emissions levels are in ppm at 15% O₂. Refer to Product Information Letter 205 for *Mercury*[™] 50 turbine emissions estimates.

For information on the availability and approvals for cold ambient temperature emissions warranties, please contact Solar's sales representatives.

Table 2 summarizes “expected” emissions levels for ambient temperatures below 0°F (–20°C) for Solar’s *SoLoNOx* turbines that do not have current production hardware or for new production hardware that is not equipped with the cold ambient fuel control logic. The emissions levels are extrapolated from San Diego factory tests and may vary at extreme temperatures and as a result of variations in other parameters, such as fuel composition, fuel quality, etc.

For more conservative NOx emissions estimate for new equipment, customers can refer to the New Source Performance Standard (NSPS) 40CFR60, subpart KKKK, where the allowable NOx emissions level for ambient temperatures < 0°F (–20°F) is 150 ppm NOx at 15% O₂. For pre-February 18, 2005, *SoLoNOx* combustion turbines subject to 40CFR60 subpart GG, a conservative estimate is the appropriate subpart GG emissions level. Subpart GG levels range from 150 to 214 ppm NOx at 15% O₂ depending on the turbine model.

Table 3 summarizes emissions levels for ambient temperatures below –20°F (–29°C) for the *Titan 250*.

Table 1. Warrantable Emissions Between 0°F and –20°F (–20° to –29°C) for New Production

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
<i>Centaur 50</i>	Gas Only	Gas	50 to 100% load	42	100	50
	Dual Fuel	Gas	50 to 100% load	72	100	50
<i>Taurus™ 60</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
<i>Taurus 65</i>	Gas Only	Gas	50 to 100% load	42	100	50
<i>Taurus 70</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
<i>Mars® 90</i>	Gas Only	Gas	50 to 100% load	42	100	50
<i>Mars 100</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
<i>Titan 130</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
<i>Titan 250</i>	Gas Only	Gas	40 to 100% load	25	50	25
	Gas Only	Gas	40 to 100% load	15	25	25
<i>Centaur 50</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Taurus 60</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Taurus 70</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Mars 100</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Titan 130</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75

Table 2. Expected Emissions below 0°F (–20°C) for SoLoNOx Combustion Turbines

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
<i>Centaur 40</i>	Gas Only or Dual Fuel	Gas	80 to 100% load	120	150	50
<i>Centaur 50</i>	Gas Only	Gas	50 to 100% load	120	150	50
	Dual Fuel	Gas	50 to 100% load	120	150	50
<i>Taurus 60</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
<i>Taurus 65</i>	Gas Only	Gas	50 to 100% load	120	150	50
<i>Taurus 70</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
<i>Mars 90</i>	Gas Only	Gas	80 to 100% load	120	150	50
<i>Mars 100</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
<i>Titan 130</i>	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
<i>Centaur 40</i>	Dual Fuel	Liquid	80 to 100% load	120	150	75
<i>Centaur 50</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Taurus 60</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Taurus 70</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Mars 100</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75
<i>Titan 130</i>	Dual Fuel	Liquid	65 to 100% load	120	150	75

Table 3. Expected Emissions below –20°F (–29°C) for the Titan 250 SoLoNOx Combustion Turbine

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
<i>Titan 250</i>	Gas Only	Gas	40 to 100% load	70	150	50

COLD AMBIENT PERMITTING STRATEGY

There are several permitting options to consider when permitting in cold ambient climates. Customers can use a tiered permitting approach or choose to permit a single emission rate over all temperatures. Historically, most construction and operating permits were silent on the ambient temperature boundaries for SoLoNOx operation.

Some customers have used a tiered permitting strategy. For purposes of compliance and annual emissions inventories, a digital thermometer is installed to record ambient temperature. The amount of time is recorded that the ambient temperature falls below 0°F. The amount of time below 0°F is then used with the emissions estimates shown in Tables 1 and 2 to estimate “actual” emissions during sub-zero operation.

A conservative alternative to using the NOx values in Tables 1, 2 and 3 is to reference 40CFR60 subpart KKKK, which allows 150 ppm NOx at 15% O₂ for sub-zero operation.

For customers who wish to permit at a single emission rate over all ambient temperatures, inlet air heating can be used to raise the engine inlet air temperature (T₁) above 0°F. With inlet air heating to keep T₁ above 0°F, standard emission warranty levels may be offered.

Inlet air heating technology options include an electric resistance heater, an inlet air to exhaust heat exchanger and a glycol heat exchanger.

If an emissions warranty is desired and ambient temperatures are commonly below –20°F (–29°C), inlet air heating can be used to raise the turbine inlet temperature (T₁) to at least –20°F. In such cases, the values shown in Table 1 can be warranted for new production.

EMISSIONS ESTIMATES IN NON-SOLONOX MODE (LOW LOAD)

At operating loads < 50% (<40% load for the *Titan 250*) on natural gas fuel and < 65% (< 80% load for *Centaur 40*) on liquid fuels, *SoLoNOx* engines are controlled to increase stability and transient response capability. The control steps that are required affect emissions in two ways: 1) pilot fuel flow is increased, increasing NO_x emissions, and 2) airflow through the combustor is increased, increasing CO emissions. Note that the load levels are approximate. Engine controls are triggered either by power output for single-shaft engines or gas producer speed for two-shaft engines.

A conservative method for estimating emissions of NO_x at low loads is to use the applicable NSPS: 40CFR60 subpart GG or KKKK. For projects that commence construction after February 18, 2005, subpart KKKK is the applicable NSPS and contains a NO_x level of 150 ppm @ 15% O₂ for operating loads less than 75%.

Table 4 provides estimates of NO_x, CO, and UHC emissions when operating in non-*SoLoNOx* mode for natural gas or liquid fuel. The estimated emissions can be assumed to vary linearly as load is decreased from just below 50% load for natural gas (or 65% load for liquid fuel) to idle.

The estimates in Table 4 apply for any product for gas only or dual fuel systems using pipeline quality natural gas. Refer to Product Information Letter 205 for *Mercury 50* emissions estimates.

Table 4. Estimated Emissions in non-*SoLoNOx* Mode

Ambient	Fuel System	Engine Load	NO _x , ppm	CO, ppm	UHC, ppm
<i>Centaur 40/50, Taurus 60/65/70, Mars 90/100, Titan 130</i>					
≥ -20°F (-29°C)	Natural Gas	Less than 50%	70	8,000	800
		Idle	50	10,000	1,000
< -20°F (-29°C)	Natural Gas	Less than 50%	120	8,000	800
		Idle	120	10,000	1,000
<i>Titan 250</i>					
≥ -20°F (-29°C)	Natural Gas	Less than 40%	50	25	20
		Idle	50	2,000	200
< -20°F (-29°C)	Natural Gas	Less than 40%	70	150	50
		Idle	70	2,000	200
<i>Centaur 50, Taurus 60/70, Mars 100, Titan 130</i>					
≥ -20°F (-29°C)	Liquid	Less than 65%	120	1,000	100
		Idle	120	10,000	3,000
< -20°F (-29°C)	Liquid	Less than 65%	120	1,000	150
		Idle	120	10,000	3,000
<i>Centaur 40</i>					
≥ -20°F (-29°C)	Liquid	Less than 80%	120	1,000	100
		Idle	120	10,000	3,000
< -20°F (-29°C)	Liquid	Less than 80%	120	1,000	150
		Idle	120	10,000	3,000

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Volatile Organic Compound, Sulfur Dioxide, and Formaldehyde Emission Estimates

Leslie Witherspoon
Solar Turbines Incorporated

PURPOSE

This Product Information Letter summarizes methods that are available to estimate emissions of volatile organic compounds (VOC), sulfur dioxide (SO₂), and formaldehyde from gas turbines. Emissions estimates of these pollutants are often necessary during the air permitting process.

INTRODUCTION

In absence of site-specific or representative source test data, Solar refers customers to a United States Environmental Protection Agency (EPA) document titled "AP-42" or other appropriate EPA reference documents. AP-42 is a collection of emission factors for different emission sources. The emission factors found in AP-42 provide a generally accepted way of estimating emissions when more representative data are not available. The most recent version of AP-42 (dated April 2000) can be found at:

<http://www.epa.gov/ttn/chief/ap42/ch03/index.html>

Solar does not typically warranty the emission rates for VOC, SO₂ or formaldehyde.

Volatile Organic Compounds

Many permitting agencies require gas turbine users to estimate emissions of VOC, a subpart of the unburned hydrocarbon (UHC) emissions, during the air permitting process. Volatile organic compounds, non-methane hydrocarbons (NMHC), and reactive organic gases (ROG) are some of the many ways of referring to the non-methane (and non-ethane) portion of an "unburned hydrocarbon" emission estimate.

For natural gas fuel, Solar's customers use 10-20% of the UHC emission rate to represent VOC

emissions. The estimate of 10-20% is based on a ratio of total non-methane hydrocarbons to total organic compounds. The use of 10-20% provides a conservative estimate of VOC emissions. The balance of the UHC is assumed to be primarily methane.

For liquid fuel, it is appropriate to estimate that 100% of the UHC emission estimate is VOC.

Sulfur Dioxide

Sulfur dioxide emissions are produced by conversion of sulfur in the fuel to SO₂. Since Solar does not control the amount of sulfur in the fuel, we are unable to predict SO₂ emissions without a site fuel composition analysis. Customers generally estimate SO₂ emissions with a mass balance calculation by assuming that any sulfur in the fuel will convert to SO₂. For reference, the typical mass balance equation is shown below.

Variables: wt % of sulfur in fuel
Btu/lb fuel (LHV*)
MMBtu/hr fuel flow (LHV)

$$\frac{\text{lb SO}_2}{\text{hr}} = \left(\frac{\text{wt\% Sulfur}}{100} \right) \left(\frac{\text{lb fuel}}{\text{Btu}} \right) \left(\frac{10^6 \text{ Btu}}{\text{MMBtu}} \right) \left(\frac{\text{MMBtu fuel}}{\text{hr}} \right) \left(\frac{\text{MW SO}_2}{\text{MW Sulfur}} \right)$$

As an alternative to the mass balance calculation, EPA's AP-42 document can be used. AP-42 (Table 3.1-2a, April 2000) suggests emission factors of 0.0034 lb/MMBtu for gas fuel (HHV*) and 0.033 lb/MMBtu for liquid fuel (HHV).

*LHV = Lower Heating Value; HHV = Higher Heating Value

Formaldehyde

In gas turbines, formaldehyde emissions are a result of incomplete combustion. Formaldehyde

in the exhaust stream is unstable and very difficult to measure. In addition to turbine characteristics including combustor design, size, maintenance history, and load profile, the formaldehyde emission level is also affected by:

- Ambient temperature
- Humidity
- Atmospheric pressure
- Fuel quality
- Formaldehyde concentration in the ambient air
- Test method measurement variability
- Operational factors

The emission factor data in Table 1 is an excerpt from an EPA memo: "Revised HAP Emission

Factors for Stationary Combustion Turbines, 8/22/03." The memo presents hazardous air pollutant (HAP) emission factor data in several categories including: mean, median, maximum, and minimum. The emission factors in the memo are a compilation of the HAP data EPA collected during the Maximum Achievable Control Technology (MACT) standard development process. The emission factor documentation shows there is a high degree of variability in formaldehyde emissions from gas turbines, depending on the manufacturer, rating size of equipment, combustor design, and testing events. To estimate formaldehyde emissions from gas turbines, users should use the emission factor(s) that best represent the gas turbines actual / planned operating profile. Refer to the memo for alternative emission factors.

Table 1. EPA's Total HAP and Formaldehyde Emission Factors for <50 MW Lean-Premix Gas Turbines burning Natural Gas

(Source: Revised HAP Emission Factors for Stationary Combustion Turbines, OAR-2002-0060, IV-B-09, 8/22/03)

Pollutant	Engine Load	95% Upper Confidence of Mean, lb/MMBtu HHV	95% Upper Confidence of Data, lb/MMBtu HHV	Memo Reference
Total HAP	> 90%	0.00144	0.00258	Table 19
Total HAP	All	0.00160	0.00305	Table 16
Formaldehyde	> 90%	0.00127	0.00241	Table 19
Formaldehyde	All	0.00143	0.00288	Table 16

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Emission Estimates at Start-up, Shutdown, and Commissioning for SoLoNOx Combustion Products

Leslie Witherspoon
Solar Turbines Incorporated

PURPOSE

The purpose of this Product Information Letter (PIL) is to provide emission estimates for start-up and shutdown events for *Solar*[®] gas turbines with *SoLoNOx*[™] dry low emissions combustion systems. The commissioning process is also discussed.

INTRODUCTION

The information presented in this document is representative for both generator set (GS) and compressor set/mechanical drive (CS/MD) combustion turbine applications. Operation of duct burners and/or any add-on control equipment is not accounted for in the emissions estimates. Emissions related to the start-up, shutdown, and commissioning of combustion turbines will not be guaranteed or warranted.

Combustion turbine start-up occurs in one of three modes: cold, warm, or hot. On large, utility size, combustion turbines, the start-up time varies by the "mode". The start-up duration for a hot, warm, or cold *Solar* turbine is less than 10 minutes in simple-cycle and most combined heat and power applications.

Heat recovery steam generator (HRSG) steam pressure is usually 250 psig or less. At 250 psig or less, thermal stress within the HRSG is minimized and, therefore, firing ramp-up is not limited. However, some combined heat and power plant applications will desire or dictate longer start-up times, therefore emissions assuming a 60-minute start are also estimated.

A typical shutdown for a *Solar* turbine is <10 minutes. Emissions estimates for an elongated shutdown, 30-minutes, are also included.

Start-up and shutdown emissions estimates for the *Mercury*[™] 50 engine are found in PIL 205.

For start-up and shutdown emissions estimates for conventional combustion turbines, landfill gas, digester gas, or other alternative fuel applications, contact Solar's Environmental Programs Department.

START-UP SEQUENCE

The start-up sequence, or getting to *SoLoNOx* combustion mode, takes three steps:

1. Purge-crank
2. Ignition and acceleration to idle
3. Loading / thermal stabilization

During the "purge-crank" step, rotation of the turbine shaft is accomplished with a starter motor to remove any residual fuel gas in the engine flow path and exhaust. During "igni-

tion and acceleration to idle," fuel is introduced into the combustor and ignited in a diffusion flame mode and the engine rotor is accelerated to idle speed.

The third step consists of applying up to 50% load¹ while allowing the combustion flame to transition and stabilize. Once 50% load is achieved, the turbine transitions to *SoLoNOx* combustion mode and the engine control system begins to hold the combustion primary zone temperature and limit pilot fuel to achieve the targeted nitrogen oxides (NO_x), carbon monoxide (CO), and unburned hydrocarbons (UHC) emission levels.

Steps 2 and 3 are short-term transient conditions making up less than 10 minutes.

SHUTDOWN PROCESS

Normal, planned cool down/shutdown duration varies by engine model. The *Centaur*[®] 40, *Centaur* 50, *Taurus*[™] 60, and *Taurus* 65 engines take about 5 minutes. The *Taurus* 70, *Mars*[®] 90 and 100, *Titan*[™] 130 and *Titan* 250 engines take about 10 minutes. Typically, once the shutdown process starts, the emissions will remain in *SoLoNOx* mode for approximately 90 seconds and move into a transitional mode for the balance of the estimated shutdown time (assuming the unit was operating at full-load).

START-UP AND SHUTDOWN EMISSIONS ESTIMATES

Tables 1 through 5 summarize the estimated pounds of emissions per start-up and shutdown event for each product. Emissions estimates are presented for both GS and CS/MD applications on both natural gas and liquid fuel (diesel #2). The emissions estimates are calculated using empirical exhaust characteristics.

COMMISSIONING EMISSIONS

Commissioning generally takes place over a two-week period. Static testing, where no combustion occurs, usually requires one week and no emissions are expected. Dynamic testing, where combustion will occur, will see the engine start and shutdown a number of times and a variety of loads will be placed on the system. It is impossible to predict how long the turbine will run and in what combustion / emissions mode it will be running. The dynamic testing period is generally followed by one to two days of "tune-up" during which the turbine is running at various loads, most likely within low emissions mode (warranted emissions range).

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¹ 40% load for the *Titan* 250 engine on natural gas. 65% load for all engines on liquid fuel (except 80% load for the *Centaur* 40).

**Table 3. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx CS/MD Applications
10 Minute Start-up and 10 Minute Shutdown
Natural Gas Fuel**

Data will NOT be warranted under any circumstances

	Centaur 40 4702S				Centaur 50 6102S				Taurus 60 7802S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.7	64.4	3.7	392	0.8	69.1	4.0	469	0.7	64.3	3.7	410
Total Emissions per Shutdown (lbs)	0.3	30.2	1.7	181	0.4	35.4	2.0	217	0.4	33.0	1.9	204

	Taurus 70 10302S				Mars 90 13002S CSMD				Mars 100 16002S CSMD				Titan 130 20502S				Titan 250 30002S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.8	73.1	4.2	519	1.2	109.3	6.2	805	1.4	123.5	7.1	829	1.9	176.9	10.1	1,161	2.6	26.2	1.7	1,794
Total Emissions per Shutdown (lbs)	1.1	93.4	5.3	575	1.5	132.6	7.6	817	1.7	149.2	8.5	920	2.4	207.6	11.9	1,272	2.9	19.1	1.4	1,918

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.
Assumes unit is operating at full load prior to shutdown.
Assumes natural gas fuel; ES 9-98 compliant.



VGf - L36GL

Power Generation - Standby

ENGINE SPEED (rpm):	1800	COOLING SYSTEM:	JW, IC + OC
DISPLACEMENT (in3):	2193	INTERCOOLER WATER INLET (°F):	130
COMPRESSION RATIO:	11:1	JACKET WATER OUTLET (°F):	180
IGNITION SYSTEM:	CEC	JACKET WATER CAPACITY (gal):	44
EXHAUST MANIFOLD:	Water Cooled	AUXILIARY WATER CAPACITY (gal):	14
COMBUSTION:	Lean Burn, Open Chamber	LUBE OIL CAPACITY (gal):	86
ENGINE DRY WEIGHT (lbs):	11200	MAX. EXHAUST BACKPRESSURE (in. H2O):	15
AIR/FUEL RATIO SETTING:	7.8% O2	MAX. AIR INLET RESTRICTION (in. H2O):	15
ENGINE SOUND LEVEL (dBA)	99	EXHAUST SOUND LEVEL (dBA)	111
IGNITION TIMING:	13° BTDC	PHASE:	3
FREQUENCY (Hz):	60	PHASE ROTATION:	T1-T2-T3
GENERATOR TYPE:	Synchronous		
VOLTAGE:	480		

SITE CONDITIONS:

FUEL:	Commercial Quality Natural Gas	ALTITUDE (ft):	1500
FUEL PRESSURE RANGE (psig):	26 - 50	MAXIMUM INLET AIR TEMPERATURE (°F):	90
FUEL HHV (BTU/ft3):	1,035.2	FUEL WKI:	91.8
FUEL LHV (BTU/ft3):	935.8		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS	MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 90 °F		
			100%	75%	50%
CONTINUOUS ENGINE POWER	BHP	880	877	660	439
OVERLOAD	% 2/24 hr	5	5	-	-
ELECTRICAL EFFICIENCY (LHV)	%	34.4	34.4	32.9	30.2
GENERATOR OUTPUT	kWe	622	620	467	310
GENERATOR kVA	kVA	778	775	584	388
GENERATOR CURRENT	Amps	937	933	703	467

based on 94.8% generator efficiency at 0.8 PF, no auxiliary engine driven equipment

FUEL CONSUMPTION

FUEL CONSUMPTION (LHV)	BTU/BHP-hr	7013	7016	7348	8001
FUEL CONSUMPTION (HHV)	BTU/BHP-hr	7757	7762	8128	8851
FUEL FLOW	SCFM	110	110	86	63

based on fuel analysis LHV

HEAT REJECTION

JACKET WATER (JW)	BTU/hr x 1000	1587	1573	1322	1066
LUBE OIL (OC)	BTU/hr x 1000	196	195	183	170
INTERCOOLER (IC)	BTU/hr x 1000	445	424	275	148
EXHAUST	BTU/hr x 1000	1726	1742	1379	973
RADIATION	BTU/hr x 1000	97	106	105	103

EMISSIONS

NOx (NO + NO2)	g/bhp-hr	2.0	2.0	2.0	2.0
CO	g/bhp-hr	1.3	1.3	1.4	1.6
THC	g/bhp-hr	1.6	1.6	1.9	2.1
NMHC	g/bhp-hr	0.24	0.24	0.28	0.32
NM, NEHC	g/bhp-hr	0.04	0.04	0.05	0.06
CH4	g/bhp-hr	1.37	1.37	1.60	1.81
CO2	g/bhp-hr	434	435	455	496
CO2e	g/bhp-hr	465	465	491	536
CH2O	g/bhp-hr	0.19	0.19	0.22	0.25

AIR INTAKE / EXHAUST GAS

INDUCTION AIR FLOW	SCFM	1862	1857	1463	1059
EXHAUST GAS MASS FLOW	lb/hr	8118	8095	6379	4616
EXHAUST GAS FLOW	ACFM	4643	4629	3622	2599
EXHAUST TEMPERATURE	°F	841	841	832	821

at exhaust temp, 14.5 psia

HEAT EXCHANGER SIZING

TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000	1799
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000	728

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS

JACKET WATER PUMP MIN. DESIGN FLOW	GPM	218
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	33
AUX WATER PUMP MIN. DESIGN FLOW	GPM	62
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	16



VGJ - L36GL

Power Generation - Standby

FUEL COMPOSITION

HYDROCARBONS:

		Mole or Volume %
Methane	CH4	93
Ethane	C2H6	4
Propane	C3H8	1
Iso-Butane	I-C4H10	0
Normal Butane	N-C4H10	0
Iso-Pentane	I-C5H12	0
Normal Pentane	N-C5H12	0
Hexane	C6H14	0
Heptane	C7H16	0
Ethene	C2H4	0
Propene	C3H6	0

NON-HYDROCARBONS:

	SUM HYDROCARBONS	98
Nitrogen	N2	0
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	2
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0
	TOTAL FUEL	100

FUEL:	Commercial Quality Natural Gas
FUEL PRESSURE RANGE (psig):	26 - 50
FUEL WKI:	91.8
FUEL SLHV (BTU/ft3):	919.50
FUEL SLHV (MJ/Nm3):	36.16
FUEL LHV (BTU/ft3):	935.78
FUEL LHV (MJ/Nm3):	36.80
FUEL HHV (BTU/ft3):	1035.15
FUEL HHV (MJ/Nm3):	40.71
FUEL DENSITY (SG):	0.60

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)].
 Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water.
 Waukesha recommends both of the following:
 1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.
 2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
 Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
 * Trademark of General Electric Company

FUEL CONTAMINANTS

Total Sulfur Compounds	0 % volume
Total Halogen as Chloride	0 % volume
Total Ammonia	0 % volume
<u>Siloxanes</u>	
Tetramethyl silane	0 % volume
Trimethyl silanol	0 % volume
Hexamethyldisiloxane (L2)	0 % volume
Hexamethylcyclotrisiloxane (D3)	0 % volume
Octamethyltrisiloxane (L3)	0 % volume
Octamethylcyclotetrasiloxane (D4)	0 % volume
Decamethyltetrasiloxane (L4)	0 % volume
Decamethylcyclopentasiloxane (D5)	0 % volume
Dodecamethylpentasiloxane (L5)	0 % volume
Dodecamethylcyclohexasiloxane (D6)	0 % volume
Others	0 % volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Chloride	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model.

**NOTES**

1. All data is based on engines with standard configurations unless noted otherwise.
2. Power rating is adjusted for fuel, site altitude, and site air inlet temperature, in accordance with ISO 3046/1 with tolerance of $\pm 3\%$.
3. Fuel consumption is presented in accordance with ISO 3046/1 with a tolerance of $-0 / +5\%$ at maximum rating. Fuel flow calculation based on fuel LHV and fuel consumption with a tolerance of $-0/+5\%$. For sizing piping and fuel equipment, it is recommended to include the 5% tolerance.
4. Heat rejection tolerances are $\pm 30\%$ for radiation, and $\pm 8\%$ for jacket water, lube oil, intercooler, and exhaust energy.
5. Emission levels are given at engine exhaust outlet flange prior to any after treatment. Values are based on a new engine operating at indicated site conditions, and adjusted to the specified timing and air/fuel ratio at rated load. Emissions are at an absolute humidity of 75 grains H₂O/lb (10.71 g H₂O/kg) of dry air. Emission levels may vary subject to instrumentation, measurement, ambient conditions, fuel quality, and engine variation. Engine may require adjustment on-site to meet emission values, which may affect engine performance and heat output. NO_x, CO, THC, and NMHC emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO₂ emissions based on EPA Federal Register/Vol. 74, No. 209/Friday, October 30, 2009 Rules and Regulations 56398, 56399 (3) Tier 3 Calculation Methodology, Equation C-5.
6. Air flow is based on undried air with a tolerance of $\pm 7\%$.
7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of $\pm 75^{\circ}\text{F}$ (42°C).
8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of $\pm 7\%$.
9. Inlet air restrictions based on full rated engine load. Exhaust backpressure based on 176 PSI BMEP and 1800 RPM. Refer to the engine specification section of Waukesha's standard technical data for more information.
10. Cooling circuit capacity, lube oil capacity, and engine dry weight values are typical.
11. Fuel must conform to Waukesha's "Gaseous Fuel Specification" S7884-7 or most current version. Fuel may require treatment to meet current fuel specification.
12. Heat exchanger sizing values given as the maximum heat rejection of the circuit, with applied tolerances and an additional 5% reserve factor.
13. Fuel volume flow calculation in english units is based on 100% relative humidity of the fuel gas at standard conditions of 60°F and 14.696 psia (29.92 inches of mercury; 101.325 kPa).
14. Fuel volume flow calculation in metric units is based on 100% relative humidity of the fuel gas at a combustion temperature of 25°C and metering conditions of 0°C and 101.325 kPa (14.696 psia; 29.92 inches of mercury). This is expressed as [25, V(0;101.325)].
15. Engine sound data taken with the microphone at 1 m (3.3 ft) from the side of the engine at the approximate front-to-back centerline. Microphone height was at intake manifold level. Engine sound pressure data may be different at front, back and opposite side locations. Exhaust sound data taken with microphone 1 meter (3.3 ft) away and 1 meter (3.3 ft) to the side of the exhaust outlet.
16. Due to variation between test conditions and final site conditions, such as exhaust configuration and background sound level, sound pressure levels under site conditions may be different than those tabulated above.
17. Cooling system design flow is based on minimum allowable cooling system flow. Cooling system maximum external restriction is defined as the allowable restriction at the minimum cooling system flow. Refer to technical data sheets S-7784-2 and S-7784-1 (or latest version) for more information.
18. Generator Standby Power Rating (kWe): This rating applies to those systems used as a secondary source of electrical power. This rating is the output the system will produce continuously 24 hours per day for the duration of the prime power source outage. No overload is allowed. This rating may reduce the lifecycle intervals.

REQUIRED OPTION CODES

Requires option code 1100 for continuous operation up to 176 psi (12.1 bar) BMEP.

Attachment O

**Monitoring / Recordkeeping / Reporting /
Testing Plans**

Monitoring/Recordkeeping/Reporting/Testing Plans

Turbine E10

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 40% load, and
- 3) 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:

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

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, 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, and SS operation are summarized in Table N-3 within Attachment N.

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 turbine is not operated at full load. 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. In addition, the Station will continuously monitor the turbine to document any 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). Columbia will use the FERC gas tariff to show compliance with the SO_2 and fuel sulfur content limits per 40 CFR §60.4365(a).

Attachment P

Public Notice

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Columbia Gas Transmission, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Permit Modification for its existing natural gas compressor station located on Walkers Branch Road near Huntington, in Wayne County, West Virginia. The latitude and longitude coordinates are: 38.36877° N and 82.53238° W.

The applicant estimates the increases in, if the modification application is approved, potential to discharge the following Regulated Air Pollutants will be: Carbon Monoxide by 56.95 tons per year, Nitrogen Oxides by 37.07 tons per year, PM10 and PM2.5 by 6.49 tons per year, Sulfur Dioxide by 0.70 tons per year, Volatile Organic Compounds by 10.83 tons per year, Carbon Dioxide Equivalents (CO₂e) by 121,934 tons per year, and Formaldehyde by 0.78 tons per year.

Startup of operation is planned to begin on or about the 1st day of November, 2018. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the day of May, 2016.

By: Columbia Gas Transmission LLC
Timothy Sweeney
Manager of Operations
485 Industrial Road
St. Albans, WV 25177-1831

Attachment R

Delegation of Authority



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: 304 926 0475 • FAX: 304 926 0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

July 27, 2011

CERTIFIED MAIL
91 7108 2133 3936 1583 6144

Mr. Victor M. Gaglio
Senior Vice-President of Operations
Columbia Gas Transmission
1700 MacCorkle Avenue, S.E.
Charleston, WV 25314

Re: Delegation of Authority Confirmation

Dear Mr. Gaglio:

Based on your letter, dated July 22, 2011, the Division of Air Quality (DAQ) hereby acknowledges the titles of Regional Director and Manager of Operations as delegated authorized representatives for the facilities listed below.

Company Name	Facility	Facility ID No.
Columbia Gas Transmission, LLC	Horse Creek Station	005-00039
Columbia Gas Transmission, LLC	Frametown Station	007-00100
Columbia Gas Transmission, LLC	Glenville Station	021-00001
Columbia Gas Transmission, LLC	Lost River Station	031-00002
Columbia Gas Transmission, LLC	Hardy Station	031-00031
Columbia Gas Transmission, LLC	Ripley Station	035-00003
Columbia Gas Transmission, LLC	Lanham Station	039-00047
Columbia Gas Transmission, LLC	Clendenin Station	039-00048
Columbia Gas Transmission, LLC	Coco Station	039-00049
Columbia Gas Transmission Corporation	Walgrove Station	039-00074
Columbia Gas Transmission Corporation	Cobb Station	039-00100
Columbia Gas Transmission Corporation	Hunt Station	039-00101
Columbia Gas Transmission Corporation	Charleston Office	039-00154
Columbia Gas Transmission Corporation	Clendenin Office	039-00546
Columbia Gas Transmission, LLC	Hubball Station	043-00002
Columbia Gas Transmission Corporation	Nye Station	043-00011
Columbia Gas Transmission, LLC	Hamlin Station	043-00027
Columbia Gas Transmission, LLC	Majorsville Station	051-00025
Columbia Gas Transmission, LLC	Adaline Station	051-00100

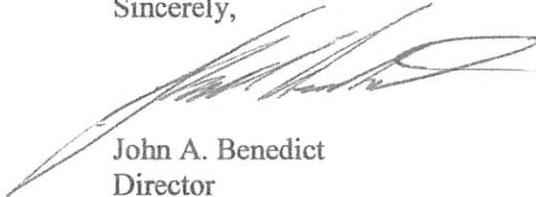
Promoting a healthy environment.

Letter to Victor M. Gaglio
July 27, 2011
Page 2

Company Name	Facility	Facility ID No.
Columbia Gas Transmission, LLC	Seneca Station	071-00008
Columbia Gas Transmission, LLC	Terra Alta Station	077-00017
Columbia Gas Transmission, LLC	Glady Station	083-00017
Columbia Gas Transmission, LLC	Files Creek Station	083-00019
Columbia Gas Transmission, LLC	Flat Top Station	089-00004
Columbia Gas Transmission, LLC	Cleveland Station	097-00009
Columbia Gas Transmission, LLC	Ceredo Station	099-00013
Columbia Gas Transmission, LLC	Kenova Station	099-00014
Columbia Gas Transmission, LLC	Smithfield Station	103-00010
Columbia Gas Transmission, LLC	Rockport Station	107-00100
Columbia Gas Transmission, LLC	Huff Creek Station	109-00021

Should you have any questions or comments, please feel free to contact our office at the address or telephone number listed above.

Sincerely,



John A. Benedict
Director

JAB/seh

c: **Joe Morgan**
Megan Murphy
File Room

Attachment S

Title V Permit Revision Information

Attachment S
Title V Permit Revision Information

1. New Applicable Requirements Summary	
Mark all applicable requirements associated with the changes involved with this permit revision:	
<input type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR15)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input checked="" type="checkbox"/> Section 111 NSPS (Subpart(s) <u>KKKK</u>)	<input checked="" type="checkbox"/> Section 112(d) MACT standards (Subpart(s)_ <u>YYYY</u>)
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> Compliance Assurance Monitoring (40CFR64) ⁽¹⁾
<input type="checkbox"/> NO _x Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> NO _x Budget Trading Program EGUs (45CSR26)
<p>⁽¹⁾ If this box is checked, please include Compliance Assurance Monitoring (CAM) Form(s) for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why Compliance Assurance Monitoring is not applicable:</p> <p style="padding-left: 40px;">This regulation does not apply because none of the proposed equipment use add-on emission controls.</p>	

2. Non Applicability Determinations
<p>List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.</p> <p>40 CFR 60 Subpart OOOO – The proposed unit is not an affected facility listed under 40 CFR §60.5365.</p>
<p><input checked="" type="checkbox"/> Permit Shield Requested <i>(not applicable to Minor Modifications)</i></p>

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

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? Yes No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
	MM/DD/YYYY	
	/ /	
	/ /	

5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
	MM/DD/YYYY	
	/ /	
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
CO	+54.65
NO _x	+39.08
PM ₁₀	+6.44
SO ₂	+0.70
VOC	+8.12
Formaldehyde	+0.69

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

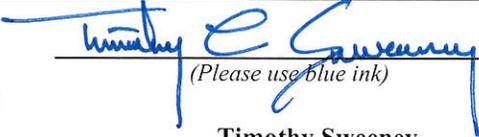
7. Certification For Use Of Minor Modification Procedures (Required Only for Minor Modification Requests)

Note: This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:

- i. Proposed changes do not violate any applicable requirement;
- ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;
- iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;
- iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;
- v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;
- vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed):	 <i>(Please use blue ink)</i>	Date:	<u>05</u> / <u>09</u> / <u>2016</u> <i>(Please use blue ink)</i>
Named (typed):	Timothy Sweeney	Title:	Manager of Operations

Note: Please check if the following included (if applicable):

<input type="checkbox"/>	Compliance Assurance Monitoring Form(s)
<input type="checkbox"/>	Suggested Title V Draft Permit Language

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