Columbia Gas
Smithfield
103-00010
R13-2064G
Jerry W

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

Columbia Gas Transmission LLC
Smithfield Compressor Station
Wetzel County, West Virginia
Title V Permit No. R30-10300010-2012(SM01)

June 2015

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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):* Smithfield Compressor Station

4. The applicant is the: ☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address: Columbia Gas Transmission LLC

5B. Facility's present physical address: State Route 20, Smithfield, WV 26437

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **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 Energy Group, Inc.

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **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): 103-00010

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R30–10300010-2012(SM01), R13-2064F

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

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B.**

Traveling north of U.S. Route 19 from Clarksburg to the intersection with State Route 20, turn left onto Route 20. Proceed west on Route 20 for approximately 1.8 miles past the town of Folsom to the station, which is on the left side of the road.

12.B. New site address (if applicable):	12C. Nearest city or town: Smithfield	12D. County: Wetzel
12.E. UTM Northing (KM): 4,370.03	12F. UTM Easting (KM): 539.68	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Installation of one Solar Centaur 40 turbine and placing two existing reciprocating engines/compressors on standby status.

14A. Provide the date of anticipated installation or change: 01/01/2016 – 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: 10/1/2016

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? ☒ **YES** ☐ **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 *(if known)*. 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 *(if known)*. 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***) .
– 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.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

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

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

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

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

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	

☒ General Emission Unit, specify One (1) natural gas-fired turbine

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

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

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System
☐ Other Collectors, specify		

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

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

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

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

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

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

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

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

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

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

Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE _____ *(Please use blue ink)* DATE: 6/1/15 *(Please use blue ink)*

35B. Printed name of signee: Glenn Fyola		35C. Title: Operations Manager
35D. E-mail: gfyolar@nisource.com	36E. Phone: 724-825-9098	36F. FAX: 724-223-2774
36A. Printed name of contact person (if different from above): Jim Alexander		36B. Title: Air Permitting
36C. E-mail: jamesalexander@nisource.com	36D. Phone: 219-647-5924	36E. FAX: 219-647-5271

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

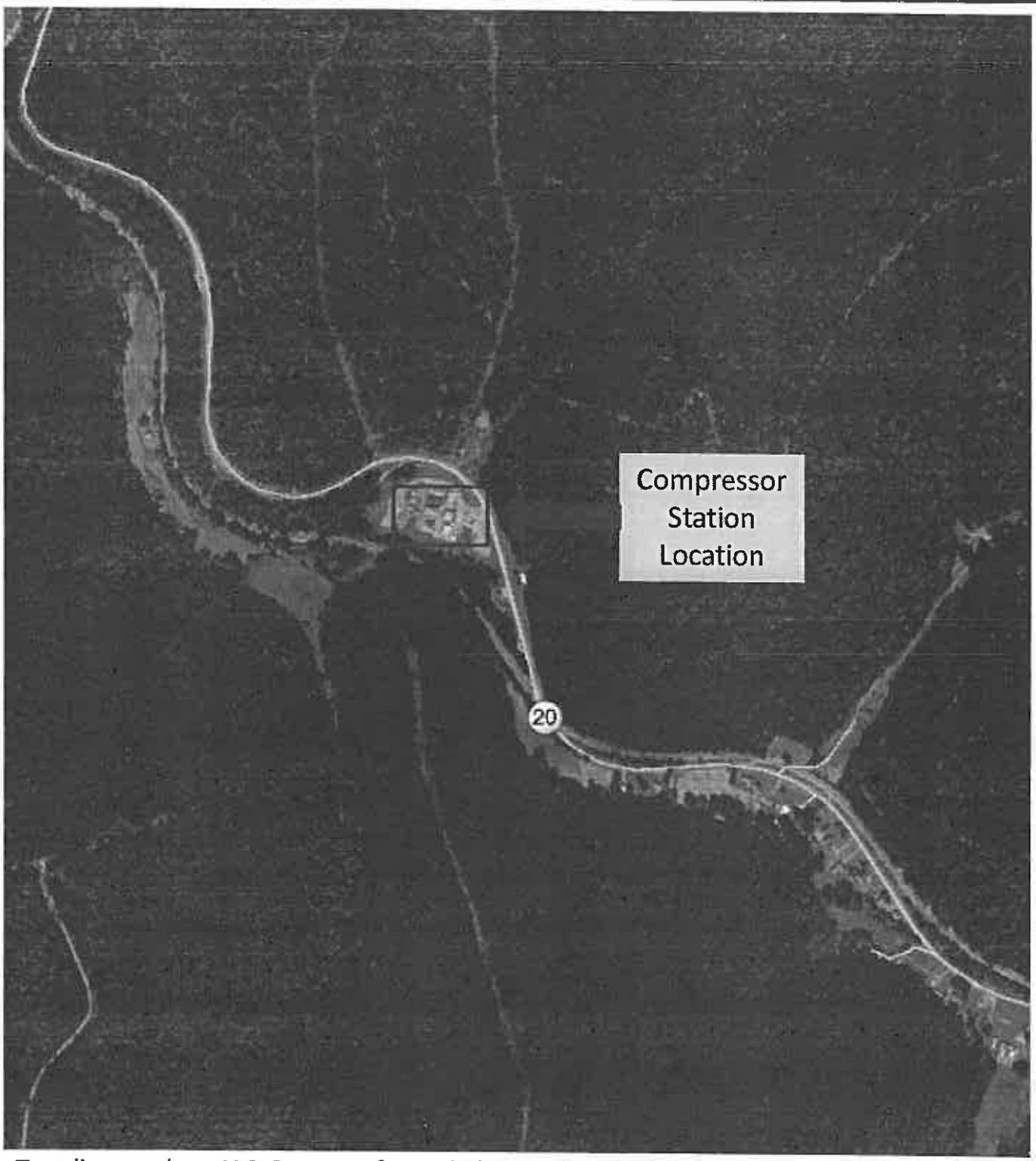
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

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.

atL006 v.4
L1430813824

Attachment B

Map



Traveling north on U.S. Route 19 from Clarksburg to the intersection with State Route 20, turn left onto Route 20. Proceed west on Route 20 for approximately 1.2 miles past the town of Folsom to the station, which is on the left side of the road.

	Attachment B
Date: June 2015	Facility Map Smithfield Compressor Station

Attachment C

Installation and Start Up Schedule

Installation and Start Up Schedule

Emission Unit	Change	Effective date of change	Start Up Date
E06 - Solar Centaur 40 Turbine	Installation	January 2016	October 2016
E01 – Ingersoll Rand 412 KVGB Recip. Engine	Standby	January 2016	October 2016
E02 – Ingersoll Rand 412 KVGB Recip. Engine	Standby	January 2016	October 2016

Attachment D

Regulatory Discussion

1.0 INTRODUCTION

1.1 Summary and Conclusions

Columbia Gas Transmission, LLC (Columbia) operates the Smithfield Compressor Station (the "Station") under Title V Permit No. R30–10300010-2012(SM01). This application package contains Columbia's application to:

- Install one (1) new Solar Centaur 40 turbine;
- Move two (2) existing reciprocating internal combustion engines (RICE) to standby status; and
- Modify the station's Title V permit to reflect these changes.

This modification (the "Project") is scheduled to occur in 2016.

An analysis of federal and state regulations was performed to identify applicable air quality regulations. Applicable federal and state regulations associated with the Project include the following.

- The Station is an existing major source under Prevention of Significant Deterioration (PSD) rules. However, the installation is not subject to PSD regulations because the emissions increase from the modification does not exceed the PSD significance level for any regulated pollutant.

- New Source Performance Standards (NSPS) for stationary combustion turbines (40 CFR 60 Subpart KKKK) are applicable. The proposed nitrogen oxide (NO_x) emission rates and fuel sulfur levels comply with NSPS limits.

- National Emission Standards for Hazardous Air Pollutants (NESHAP) for stationary combustion turbines (40 CFR 63 Subpart YYYY) are not applicable. The Station is not a major HAP source under 40 CFR 63.

- Compliance Assurance Monitoring (CAM) for major sources (40 CFR 64) is not applicable. This regulation does not apply because the turbine does not use add-on emission controls.

- Prevention and Control of Smoke and Particulate Matter (45 CSR 2) is applicable. The proposed turbine is inherently compliant with these rules by combusting only natural gas.

- Prevention and Control of Sulfur Dioxide (45 CSR 10) is applicable. The proposed turbine is subject to the more stringent fuel sulfur limit in NSPS Subpart KKKK and therefore complies with this rule.

- Permits for Construction or Modification of Stationary Sources of Air Pollutants (45 CSR 13) is applicable. A permit application is being submitted to WVDAQ as part of this application package.

- Requirements for Operating Permits (45 CSR 30) is applicable. A significant modification application is being submitted to WVDAQ as part of the application package.

1.2 Report Organization

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

2.0 PROJECT DESCRIPTION

2.1 Description of Existing Facility

Columbia's Smithfield Compressor Station is located in Wetzel County, West Virginia, near the town of Smithfield. The Station receives natural gas via pipeline from an upstream compressor station, compresses it using two natural gas-fired RICE and a compressor turbine, and then 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. R30-10300010-2012(SM01). The Station has the potential to operate seven (7) days per week, twenty-four (24) hours per day.

The Station currently operates two (2) RICE and one (1) turbine for compression. The engines are Ingersoll-Rand 412 KVGB engines each rated at 1,500 hp that were installed in 1963 (E01 and E02). The turbine is a 6,736-hp Solar Taurus 60 installed in 1999 (E05). Auxiliary equipment at the Station includes a natural gas-fired emergency generator, (3) process heaters, a heating system boiler, and various insignificant storage tanks. A plot plan of the Station is provided as Attachment E.

Based on potential annual emissions (shown below in Table 2-1), the Station is classified as a major source of NO_x under New Source Review (NSR) regulations.

Table 2-1 Existing Station Potential Annual Emissions (tpy)

Source	NO_x	CO	VOC	SO_2	PM_{10} / $PM_{2.5}$	CH_2O	Total HAP
Facility-Wide	535.3	70.2	16.4	0.27	3.0	6.82	9.37

Wetzel County is classified as attainment or unclassifiable for all National Ambient Air Quality Standards (NAAQS). The surrounding counties include Marshall County, part of which is designated nonattainment of the SO_2 NAAQS, and Greene County, PA, which includes Monongahela Township which is designated nonattainment for the annual and 24-hour $PM_{2.5}$ NAAQS. The station is located within 62 miles (100 kilometers) of one Class I Area. Otter Creek Wilderness Area is located approximately 55 miles (90 kilometers) southeast of the station in Randolph and Tucker Counties, West Virginia.

2.2 Proposed Modification

Through this application, NiSource is proposing to install one (1) new Solar Centaur 40 turbine and place two existing RICE on standby status. The proposed Solar Centaur 40 turbine will have an output of 4,213 hp at 32 °F, and it will be designated Emission Point ID E06. Attachment F includes a process flow diagram showing the existing and Project equipment. The U.S. Environmental Protection Agency (USEPA) Source Classification Code (SCC) for the proposed turbine is 2-02-002-01.

The new turbine will be equipped with advanced dry low NO_x combustion controls, known by the manufacturer as SoLoNOx. These controls reduce NO_x and peak combustion temperatures through the use of a lean, premixed air/fuel mixture and advanced combustion controls. The SoLoNOx system is operational at turbine loads from approximately 50% to 100% of full load. The NO_x emission rates are at or below those required by the NSPS Subpart KKKK (as discussed in Section 3.2 of this document).

Emission rates are summarized in Table 2-2 for NO_x, CO, VOC, SO_2, PM_{10}, $PM_{2.5}$, and formaldehyde (the primary HAP) for the proposed turbine at normal operating conditions and maximum power output. The turbine emission rates in Table 2-2 are based on 4,433 hp (operating at 0 °F). NO_x, CO, and VOC, emission rates for the new turbine are based on manufacturer performance data. Supporting materials related to emissions from the proposed turbine are included in Attachment N.

Table 2-2 Emission Rates for New Turbine During Normal Operation (g/hp-hr)[1]

Emission Point ID	Model	Basis	NO_x	CO	VOC[2]	SO_2[3]	PM_{10} / $PM_{2.5}$	CH_2O
E09	Solar Centaur 40	4,433 HP (at 0 °F)	0.45	0.55	0.03	0.28	*0.03*	*0.004*

[1] Based on vendor performance data at 0 °F; 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.

During operation at low turbine loads (<50% of full load), low ambient temperatures (<0 °F), and during turbine startup and shutdown, supplemental fuel is fired through the pilot burners for flame stability and results in NO_x, CO, and VOC concentrations that are higher than during SoLoNOx operation. At low ambient temperatures, the turbine operates in one mode at temperatures between 0 and -20 °F and in a different mode at temperatures below -20 °F. Estimated emissions during each of the operation modes are summarized in Table 2-3. These values are based on manufacturer information provided in Attachment N. A pneumatic starter powered by compressed natural gas is used to rotate the turbine during the startup cycle prior to combustor light-off. Additional turbine emission data and calculations are presented in Attachment N.

No other changes in station equipment are currently being proposed. The target date for starting construction is January 2016. Initial commercial operation is scheduled for October 2016.

Table 2-3 Emissions from Proposed Titan Turbine during non-SoLoNOx Operation

Mode	Basis	ppmv @ 15% O_2			lb/hr		
		NO_x	CO	VOC	NO_x	CO	VOC[4]
Low Ambient Temperature[1]	0 to -20 °F	42	100	10	7.67	11.11	0.63
Low Load[2]	<50%	66	4,400	88	7.51	304.73	3.48
Startup/Shutdown[3]	Per cycle				1.00	94.60	1.08

[1] Emission rates in ppmv @ 15% O_2 are per Solar Product Information Letter 167 (included in Attachment N).

[2] Emission rates provided by Solar at 40% load.

[3] Values are from Solar Product Information Letter 170 and are in lbs per startup/shutdown cycle (cycle includes 10 minutes for startup and 10 minutes for shutdown) and include emissions from pneumatic starter.

[4] VOC is based on 20 percent of unburned hydrocarbons per Solar Product Information Letter 168.

2.3 Contemporaneous Equipment Changes

In 2014, one (1) new Waukesha emergency generator was installed, and the existing emergency generator was retired. In addition, a small process heater was installed. In tabular form, the contemporaneous equipment changes are shown below in Table 2-4.

Table 2-4 Contemporaneous Equipment Changes

Equipment	Emission Point ID	Action	Date
Waukesha VSG11GSI Emergency Generator	G2	Retired	2014
Waukesha VGF24GL Emergency Generator	G3	Installed	2014
Ingersoll Rand 412 KVGB Reciprocating Engine	E01	To be standby	2016
Ingersoll Rand 412 KVGB Reciprocating Engine	E02	To be standby	2016
Solar Centaur 40 Turbine	E06	To be installed	2016

3.0 REGULATORY ANALYSIS AND COMPLIANCE METHODS

This section reviews the applicability of state and federal regulations potentially affecting the Project. Supporting calculations are included in Attachment N.

3.1 Prevention of Significant Deterioration

For a major stationary source such as the existing Station, Prevention of Significant Deterioration (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 emission increase associated with the project itself is evaluated. If the project will result in a significant emission increase (as defined at 40 CFR §52.21(b)(23)), then the net emission increase, considering all contemporaneous equipment changes must be evaluated.

Per 45 CSR 14-2.80.e.1, following July 1, 2011, for new major stationary sources that will emit or have the potential to emit greater than or equal to 100,000 tpy of CO_2 equivalent (CO_2e) emissions of greenhouse gases were required to meet the requirements set forth in the PSD program. The provisions of 45 CSR 14-2.80.f, however, clarified that this portion of the rule ceases to be effective under certain circumstances, including a federal court decision invalidating provisions of the rule. On June 23, 2014, the U.S. Supreme Court issued a decision that greenhouse gas emissions could not be a basis for PSD or Title V applicability, and this decision was followed by a July 24, 2014 memorandum from the USEPA that stated that the USEPA will comply with the Court's decision and will not apply or enforce regulations that would require a PSD permit where PSD would be applicable solely because of GHG emissions. Therefore, CO_2e emissions are no longer considered for PSD applicability.

Potential annual emissions associated with the Project are summarized in Table 3-1. The new Solar Centaur turbine is expected to operate essentially the entire year, and emission estimates are based on 8,760 operating hours per year. Because the SoLoNOx controls cannot operate properly at low ambient temperatures or below 50% of peak load, the potential emission estimates presented in Table 3-1 include separate lines for operating hours at: (1) ambient temperatures of 0 to -20 °F, (2) low load (less than 50% load), and (3) startup/shutdown cycles (50 per year). To be conservative, annual emissions from the proposed turbine during the rest of the year are conservatively based on an ambient temperature of 32 °F.

Table 3-1 Potential Criteria Pollutant Emissions from Proposed New Turbine (tpy)

Source	Operating Mode	Cycles	Hr/Yr	NO_x	CO	CO_2e	PM_{10}	$PM_{2.5}$	VOC	SO_2[1]
T03 Solar Centaur 40	Normal Load @ 32 °F		8,643	17.89	21.82	23,294	1.31	1.31	1.25	0.14
	Low Temp (<0 °F)		50	0.19	0.28	135	0.01	0.01	0.02	0.001
	Low-Load (<50%)		50	0.19	7.62	135	0.01	0.01	0.09	0.001
	Startup/Shutdown	50	17	0.03	2.37	45	0.00	0.00	0.03	0.000
	Total		8,760	18.30	32.09	23,609	1.33	1.33	1.38	0.14
Venting	Normal					1,395			2.16	
Equipment Leaks	Fugitive					129			0.20	
	Grand Total[2]			18.3	32.1	25,004	1.33	1.33	3.54	0.14
	PSD Significance Level			40	100		15	10	40	40

[1] Based on typical U.S. gas quality of 0.25 gr/100 scf.

[2] Fugitive emissions are not included in PSD applicability analyses for the compressor station source types.

As shown in Table 3-1, potential emissions increases from this modification do not exceed the PSD significance levels for any pollutants. Therefore, the Project is not subject to PSD requirements, and no net emission change calculations are necessary. To ensure that future actual emissions remain below the PSD significance levels, the Station will accept requirements to monitor turbine operating mode (e.g., low temperature, low load, startup/shutdown).

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.

The USEPA has promulgated NSPS for stationary combustion turbines in 40 CFR 60 Subpart KKKK. Subpart KKKK applies to combustion turbines with a peak heat input of 10 MMBtu/hr and greater. The proposed Solar Titan 130 turbine has a heat input of 43.7 MMBtu/hr at 59 °F based on the higher heating value (HHV) of the fuel, and it will be subject to the requirements of Subpart KKKK. Sources covered by Subpart KKKK are exempt from the requirements in Subpart GG (the previous combustion turbine NSPS). The subcategory and corresponding NO_x emission standard as established in Table 1 to Subpart KKKK for the proposed turbine is shown in Table 3-2 below.

Table 3-2 Proposed Turbine and Corresponding Category and Emission Standard

Unit	Table 1 subcategory	Heat input	NOx Emission Standard	Manufacturer's Warranty
Solar Centaur 40 (E06)	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% O_2 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 SO_2/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.

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. Unless continuous parameter monitoring is implemented, annual performance testing using EPA reference methods must be conducted within 14 calendar months following the previous performance test. Test frequency can be reduced to biennial if measured NO_x emissions are < 75% of limit. Columbia requests that portable emissions analyzers be approved for annual turbine testing. In addition, Columbia will continuously monitor the turbine to document any operating periods during which the SoLoNOx system is not in service (e.g., during startup, shutdown, low-load, or a system malfunction). Records of turbine startup, shutdown, SoLoNOx malfunction, and/or SoLoNOx monitoring system malfunction will be recorded per Subpart KKKK and NSPS General Provisions in 40 CFR §60.7(b)&(c).

Compliance with the SO_2 and fuel sulfur limits can be demonstrated by monitoring natural gas sulfur content annually. However, per 40 CFR §60.4365(a), the turbine will be exempt from periodic

monitoring by demonstrating compliance with the FERC tariff limit on total sulfur content of <20 grains of sulfur per 100 standard cubic feet.

3.3 National Emission Standards for Hazardous Air Pollutants

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

40 CFR 63 Subpart YYYY is only applicable to major sources of HAPs; therefore, the turbine is not subject to this regulation.

3.4 Compliance Assurance Monitoring (40 CFR 64)

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

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

As defined in Part 64, "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 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. 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 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 the proposed unit not exceed opacity levels of 10 percent based on a six-minute block average. The proposed equipment 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 requires that the in-stack SO_2 concentration from the proposed source not to exceed 2,000 ppm by volume (45 CSR §10-4.1). As stated in Section 3.2.1 above, the turbine will be subject to NSPS Subpart KKKK. The NSPS limit on fuel sulfur content of 20 grains sulfur per 100 scf equates to an exhaust gas SO_2 concentration of < 1 ppmv SO_2 in the turbine exhaust, which is less than the 2,000 ppmv limit. Therefore, the turbine will be in compliance with 45 CSR 10-4.1.

Also, 45 CSR §10-5.1 requires that any combusted process gas stream contains hydrogen sulfide of less than 50 grains per 100 cubic feet of gas. Proof of compliance with the FERC limit of 20 grains sulfur per 100 scf is sufficient to document compliance with both of the 45 CSR 10 limitations.

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

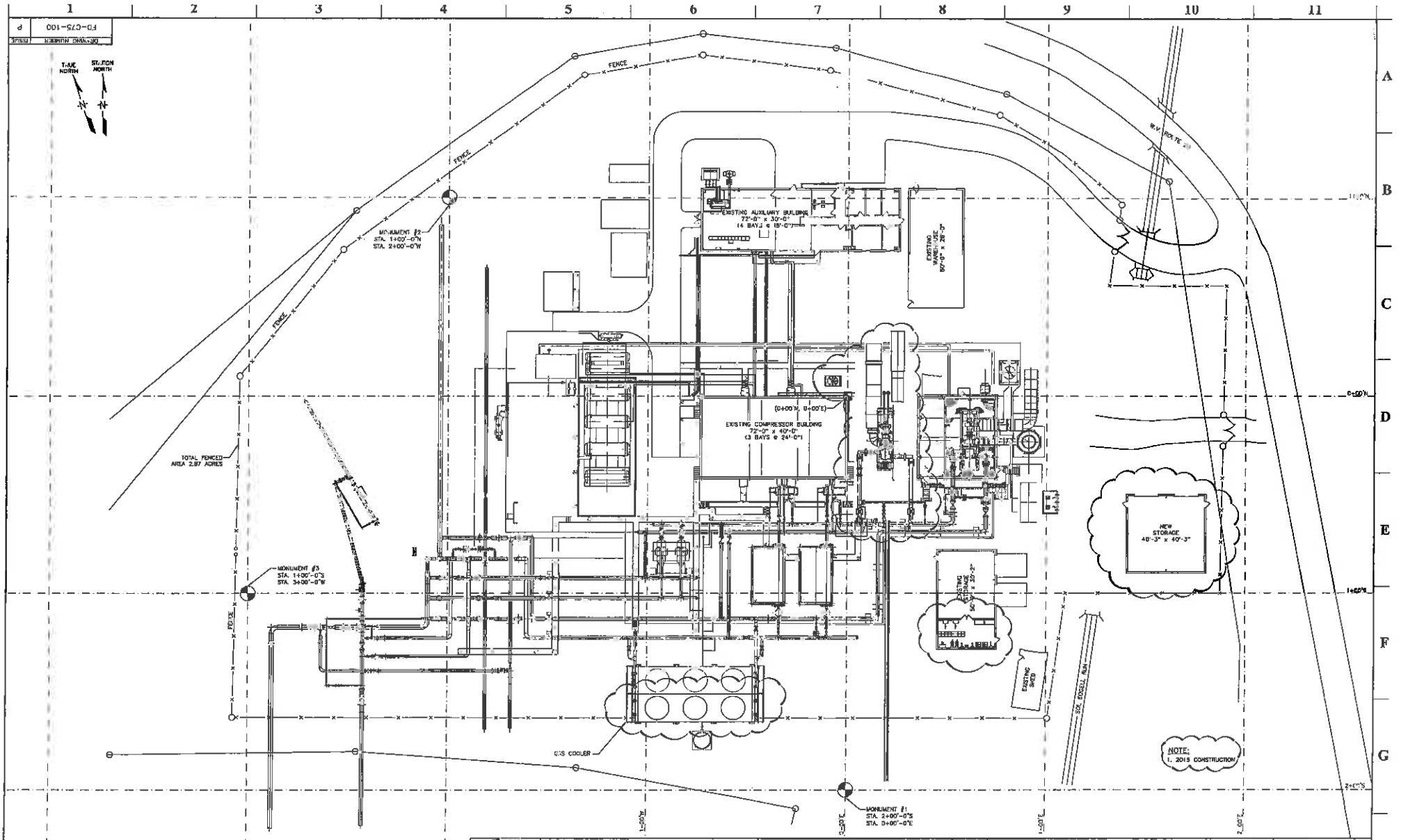
Because the potential increase in emissions from the proposed Project does not exceed PSD significance levels, the Project is classified as a minor modification to the existing station for PSD purposes and is subject to the permitting requirements in 45 CSR 13. This document contains the information required by this permitting program.

3.8 Requirements for Operating Permits (45 CSR 30)

After this Project, the Smithfield 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



1	2	3	4	5	6	7	8	9	10	11

A B C D E F G H

FD-C75-100 P

BASIC SYSTEMS, INC.
8155 CADIZ ROAD
CAMBRIDGE, OHIO 43725
(740) 435-3001

NON-SCALED

DESIGN PRESSURE: ____ PSIG AT ____°F (____ DESIGN FACTOR)
MINIMUM HOOP STRESS LEVEL AT ____ PSIG ____% SMYS.
BASED ON ____ MOP OF ____ PSIG AT ____°F IS LIMITED BY ____
MINIMUM TEST PRESSURE ____ PSIG, MAXIMUM TEST PRESSURE ____ PSIG.
TEST LIMITED BY: ____ TEST PERIOD ____ HOURS
TEST MEDIUM: SERVICE
NONDESTRUCTIVE INSPECTION REQUIREMENTS: ____

CERTIFICATE
TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DESIGN ARE DESIGNED IN ACCORDANCE WITH APPLICABLE CPC GUIDELINES AND SPECIFICATIONS.

DESIGN ENGINEER — 01/10/14 DATE

NO. REVISIONS BY APPROVED DATE

NO. REVISIONS BY APPROVED DATE

NO. REVISIONS BY APPROVED DATE

BWTL NO. REFERENCE

PROJECT DELIVERY
PROJECT ENGINEERING
Columbia Pipeline Group

SMITHFIELD COMPRESSOR STATION

TITLE: PLOT PLAN

DRAWN BY: CCU DATE: 05/06/2015

CPD PROJECT NUMBER(S): 18669

CPCT W.O. NUMBER(S): 43844

DRAWING NUMBER: FD-C75-100

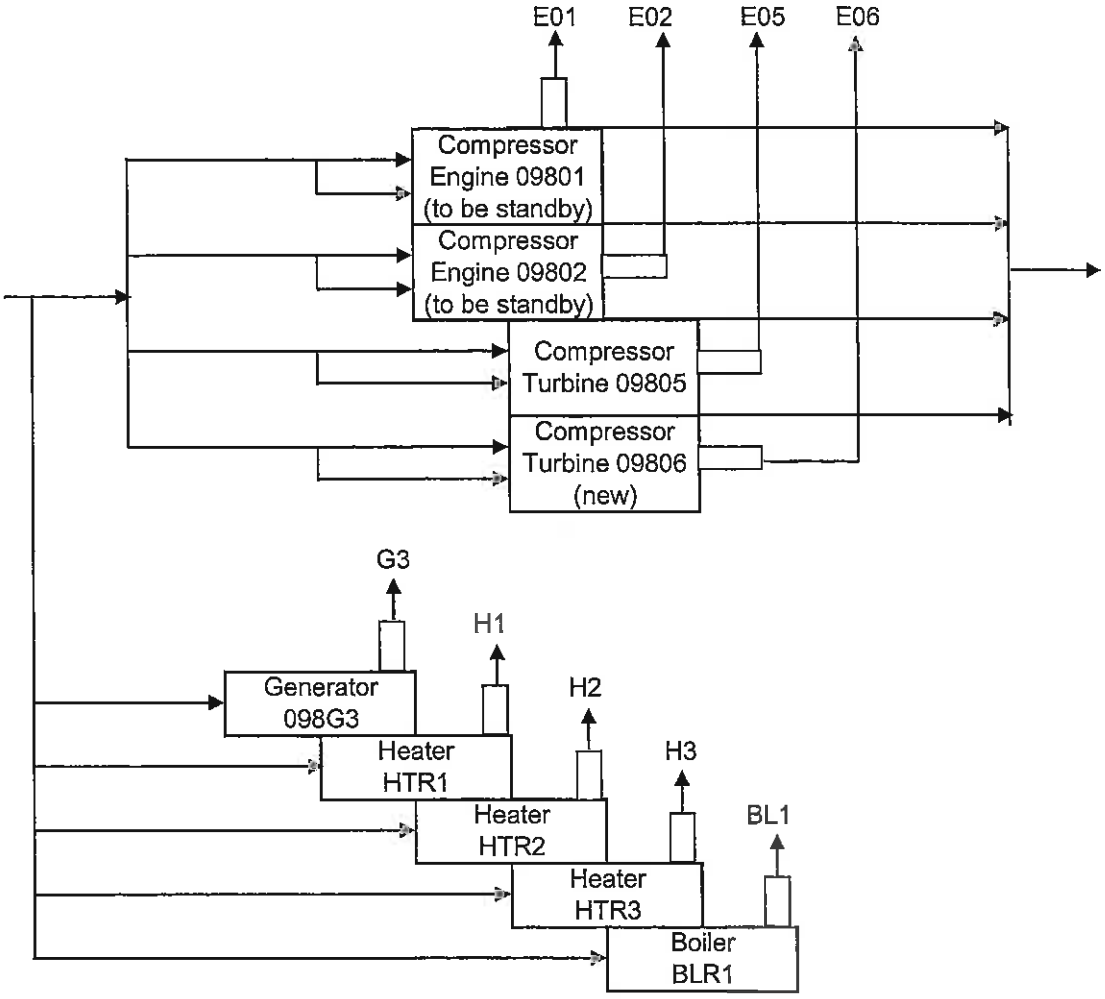
ISSUE: P

s:\1300s\1788 - CPG Smithfield Compressor Station\Drawings\1-C75-100.dwg
5/7/2015 4:33 PM
Chris Ireland

Attachment F

Detailed Process Flow Diagram

ATTACHMENT F
SMITHFIELD COMPRESSOR STATION PROCESS FLOW DIAGRAM



Columbia Gas Transmission
A NiSource Company

Attachment G

Process Description

Process Description

Pipeline transmission of natural gas requires that the gas be compressed. At the Smithfield Compressor Station, two (2) reciprocating internal combustion engines (RICE) and one (1) turbine are used to drive centrifugal gas compressors. This project includes the installation of one additional Solar turbine-driven compressor. In addition, the two existing RICE will be placed on standby status. 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 SoLoNOx) limits formation of NO_x, CO, and VOC by pre-mixing air and fuel prior to combustion. When operating a Solar Centaur 40 turbine at ambient temperatures ≥ 0 °F and at loads ≥ 50%, this DLN system is able to limit the exhaust gas concentration of these pollutants (corrected to 15% O_2) to 25 ppm NO_x, 50 ppm CO, and 25 ppm unburned hydrocarbons (UHC, containing at least 80% non-VOC methane and ethane; therefore, 5 ppm VOC). At ambient temperatures of 0 to -20 °F, additional pilot fuel is required by the turbine to maintain flame stability, which increases estimated emission concentrations to 42 ppm NO_x, 100 ppm CO, and 50 ppm UHC (10 ppm VOC). At ambient temperatures <-20 °F, additional pilot fuel is required by the turbine to maintain flame stability, which increases estimated emission concentrations (based on expected emissions at < 0 °F) to 120 ppm NO_x, 150 ppm CO, and 50 ppm UHC (10 ppm VOC). At turbine loads < 50%, additional pilot fuel and air flow are required to maintain flame stability and turbine responsiveness. These changes increase estimated emission concentrations to 66 ppm NO_x, 4,400 ppm CO, and 440 ppm UHC (88 ppm VOC). Should loads drop below 50%, Columbia will make every effort to either bring the load back above 50% or shut a turbine down (e.g., shut down other units and move that volume to the turbine, or shift the turbine volume to other units and shut down the turbine).

In addition, there are changes in NO_x, CO, and VOC emissions during the initial fuel light-off, turbine loading, and flame stabilization steps associated with turbine startup. There are also changes in emissions during the normal turbine shutdown sequence. For a Solar Centaur 40 turbine, the startup sequence takes less than 10 minutes to complete prior to engaging the DLN system. The shutdown sequence for a Taurus turbine requires approximately 10 minutes. Emissions during each startup/shutdown cycle are estimated by Solar at 1.00 lb NO_x, 94.60 lb CO, and 1.08 lb VOC.

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:

Operating Mode	Units	NO_x	CO	VOC
Full Load @ 32 °F	lb/hr	4.14	5.05	0.29
Low-Temp Operation (<0 to -20 °F)	lb/hr	7.67	11.11	0.63
Low Load (<50%)	lb/hr	7.51	304.73	3.48
Startup/Shutdown	lb/event*	1.00	94.60	1.08

*Startup/Shutdown values are lb/event not lb/hr

Additional information on turbine operating characteristics and emissions is provided in Attachment N to this application.

Attachment H

MSDSs

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 MSDS 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]
BLR1	BL1	Heating System Boiler American Standard model 1 BN-J-3	1963	3.4 MMBtu/hr	Existing, remains in service	-
HTR1	H1	Line Heater BS&B Model J-92-02	1970	0.25 MMBtu/hr	Existing, remains in service	-
HTR2	H2	Line Heater Total Energy Resources, Inc. Model 99-26	1999	0.50 MMBtu/hr	Existing, remains in service	-
HTR3	H3	Heater #3	2014	0.30 MMBtu/hr	Existing, remains in service	-
09801	E01	Reciprocating Engine/Integral Compressor Ingersoll Rand 412 KVGB, 4-cycle, lean burn	1963	1,500 HP	Existing, to be placed on standby	-
09802	E02	Reciprocating Engine/Integral Compressor Ingersoll Rand 412 KVGB, 4-cycle, lean burn	1963	1,500 HP	Existing, to be placed on standby	-
09805	E05	Turbine Engine/Centrifugal Compressor Solar Taurus 60-T7302S	1999	6,736 HP	Existing, remains in service	-
098G3	G3	Waukesha VGF24GL Emergency Generator #3	2014	530 HP	Existing, remains in service	-
09806	E06	Solar Centaur 40 Turbine	2016	4,433 HP 0 °F 4,213 HP 32 °F	New, 2016	-

[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			
BL1		BLR1		-		-	-	NO_x	0.33	1.46			Gas	EE	
								CO	0.28	1.23			Gas	EE	
								VOC	0.02	0.08			Gas	EE	
								SO_2	0.19	0.01			Gas	EE	
								PM	0.03	0.11			Solid	EE	
								CH_2O	0.0003	0.001			Gas	EE	
H1		HTR1		-		-	-	NO_x	0.02	0.11			Gas	EE	
								CO	0.02	0.09			Gas	EE	
								VOC	0.001	0.01			Gas	EE	
								SO_2	0.01	0.001			Gas	EE	
								PM	0.002	0.008			Solid	EE	
								CH_2O	0.00002	0.00008			Gas	EE	
H2		HTR2		-		-	-	NO_x	0.05	0.21			Gas	EE	
								CO	0.04	0.18			Gas	EE	
								VOC	0.003	0.01			Gas	EE	
								SO_2	0.03	0.002			Gas	EE	
								PM	0.004	0.02			Solid	EE	
								CH_2O	0.00004	0.0002			Gas	EE	
H3		HTR3		-		-	-	NO_x	0.03	0.13			Gas	EE	
								CO	0.02	0.11			Gas	EE	
								VOC	0.002	0.01			Gas	EE	
								SO_2	0.02	0.0009			Gas	EE	
								PM	0.002	0.01			Solid	EE	
								CH_2O	0.00002	0.0001			Gas	EE	
E01		09801		-		-	-	NO_x	63.95	254.65			Gas	EE	
								CO	4.97	19.79			Gas	EE	
								VOC	1.85	7.36			Gas	EE	
								SO_2	0.90	0.04			Gas	EE	
								PM	0.16	0.62			Solid	EE	
								CH_2O	0.83	3.30			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			
E02		09801		-		-	-	NO_x	63.95	254.65			Gas	EE	
								CO	4.97	19.79			Gas	EE	
								VOC	1.85	7.36			Gas	EE	
								SO_2	0.90	0.04			Gas	EE	
								PM	0.16	0.62			Solid	EE	
								CH_2O	0.83	3.30			Gas	EE	
E05		09805		-		-	-	NO_x	6.04	23.51			Gas	EE	
								CO	7.36	28.66			Gas	EE	
								VOC	0.22	0.84			Gas	EE	
								SO_2	3.46	0.17			Gas	EE	
								PM	0.40	1.56			Solid	EE	
								CH_2O	0.04	0.17			Gas	EE	
G3	Upward Vertical Stack	098G3		-		-	-	NO_x	2.34	0.58			Gas	EE	
								CO	1.52	0.38			Gas	EE	
								VOC	0.30	0.08			Gas	EE	
								SO_2	0.25	0.0008			Gas	EE	
								PM	0.04	0.01			Solid	EE	
								CH_2O	0.23	0.06			Gas	EE	
E06	Upward Vertical Stack	09806		-		-	-	NO_x	4.40	18.30			Gas	EE	
								CO	5.36	32.09			Gas	EE	
								VOC	0.31	1.38			Gas	EE	
								SO_2	2.78	0.14			Gas	EE	
								PM	0.32	1.33			Solid	EE	
								CH_2O	0.03	0.14			Gas	EE	

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

[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, CS_2, VOCs, H_2S,

Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, 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/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
BL1					890		4,370.03	539.68
H1					890		4,370.03	539.68
H2					890		4,370.03	539.68
H3					890		4,370.03	539.68
E01					890		4,370.03	539.68
E02					890		4,370.03	539.68
E05					890		4,370.03	539.68
G3	0.67	844	3,173	152	890	20	4,370.03	539.68
E06	3.75	751	85,091	128.4	890		4,370.03	539.68

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

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? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ 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.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ 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	(Existing Sources Only)					
Wastewater Treatment Evaporation & Operations						
Equipment Leaks	Methane CO_2 GHG (CO_2e)	Does not apply	5.16 0.15 129.14	Does not apply	5.16 0.15 129.14	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, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	light liquid VOC[6,7]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC	N/A - less than 10% VOC			
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC	36	0	N/A	4,154 lb CH4/yr
Safety Relief Valves[11]	Gas VOC	N/A - less than 10% VOC			
	Non VOC	16	0	N/A	83 lb CH4/yr
Open-ended Lines[12]	VOC	N/A - less than 10% VOC			
	Non-VOC	77	0	N/A	3,255 lb CH4/yr
Sampling Connections[13]	VOC	N/A - less than 10% VOC			
	Non-VOC	6	0	N/A	53 lb CH4/yr
Compressors	VOC	N/A - less than 10% VOC			
	Non-VOC	2	0	N/A	N/A - emissions included in other component estimates
Flanges	VOC	N/A - less than 10% VOC			
	Non-VOC	314	0	N/A	2,765 lb CH4/yr
Other	VOC	N/A - less than 10% VOC			
	Non-VOC	2 meters	0	N/A	10 lb CH4/yr

[1 - 13] See notes on the following page.

Attachment L

Emissions Unit Data Sheets

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*): 09806

1. Name or type and model of proposed affected source: Solar Centaur 40 turbine. Emission unit number E06.
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:

395.33 million cubic feet per year (equivalent to 403,233.5 MMBtu/yr) for Turbine 09806.

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

All values in volume percent.

methane	93.25
ethane	3.68
propane	0.88
I-Butane	0.07
N-Butane	0.19
I-Pentane	0.03
N-Pentane	0.003
Hexane	0.012

Carbon Dioxide 0.99 Nitrogen 0.89 Sulfur Dioxide 0.0001 ash - nil

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

@ °F and psia.

(d) Percent excess air:

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

48.66 MMBtu/hr at 0 °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: 48.66 × 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:

@ 0 °F and Full Load psia

a.	NO_X	4.40	lb/hr	grains/ACF
b.	SO_2	2.78	lb/hr	grains/ACF
c.	CO	5.36	lb/hr	grains/ACF
d.	PM_{10}	0.32	lb/hr	grains/ACF
e.	Hydrocarbons	1.53	lb/hr	grains/ACF
f.	VOCs	0.31	lb/hr	grains/ACF
g.	Pb	0	lb/hr	grains/ACF
h.	Specify other(s)			
	CO_2e	5,698	lb/hr	grains/ACF
	Formaldehyde	0.03	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	RECORDKEEPING
To demonstrate compliance with the turbine annual emission rates in the permit, Columbia proposes to maintain the following records: 1) Monthly operating hours, 2) Monthly operating hours at less than 50% load, 3) Monthly operating hours at less than 0 to -20°F ambient temperature, 4) Monthly operating hours at less than -20°F, and 5) Monthly number of startup and shutdown cycles.	Maintain records of monitored parameters.
REPORTING	**TESTING**
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 report will be submitted before the close of business on the 60th day following the completion of testing.	Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NOx emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be allowed for annual turbine testing.

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

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

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

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

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

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

Attachment N

Supporting Emissions Calculations

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Facility Total PTE

Source	Annual Emissions (tpy)							
	NO_x	CO	CO_2e	$PM_{10}/PM_{2.5}$	VOC	SO_2	CH_2O	Total HAP
New Sources PTE[1]	18.30	32.09	25,004	1.33	3.54	0.14	0.14	0.21
Solar Centaur 40 Turbine	18.30	32.09	23,609	1.33	1.38	0.14	0.14	0.21
Equipment Leaks (fugitive emissions)[2]			129		0.20			
Venting			1,395		2.16			
Current PTE[1]	535.32	70.22	44,632	2.96	16.38	0.27	6.82	9.37
(2) Ingersoll-Rand 412KVGB	509.31	39.57	14,606	1.25	14.73	0.09	6.59	9.01
Solar Taurus 60 Turbine	23.51	28.66	27,616	1.56	0.84	0.17	0.17	0.24
Emergency Generator	0.58	0.38	129	0.01	0.08	7.89E-04	0.06	0.08
Heating System Boiler	1.46	1.23	1,742	0.11	0.08	0.01	0.00	0.03
(3) Heaters	0.45	0.38	538	0.03	0.02	3.28E-03	3.38E-04	0.01
Various Tanks & Fugitives					0.63			
PSD Significance Threshold	40	100	n/a[3]	15 / 10	40	40		
Proposed PTE[1]	553.61	102.30	69,636	4.29	19.92	0.42	6.96	9.58

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Solar Centaur 40 Turbine - To be installed

Horsepower	4,213 hp (32 °F)
Brake Specific Fuel Consumption	9,843 Btu/Bhp-hr (LHV, 32 °F)
Total Heat Input	41.47 MMBtu/hr (LHV, 32 °F)
	46.03 MMBtu/hr (HHV, 32 °F)[3]
Maximum Heat Input (at 0 °F)	43.84 MMBtu/hr (LHV, 0 °F)
	48.66 MMBtu/hr (HHV, 0 °F)[3]
Operating Hours	8,760 hr/yr
Natural Gas Heat Content	1,020 Btu/scf
Fuel Consumption	395.33 MMscf/yr (based on 32 °F)
	47,708 scf/hr (based on 0 °F)

Pollutant	Emission Factor			Emission Rate		Emission Factor Reference
	ppmvd@15%O_2	lb/MMBtu		lb/hr[1]	ton/yr[2]	
NO_x	25.00	0.100	LHV	4.40	18.30	Vendor Data
CO	50.00	0.122	LHV	5.36	32.09	Vendor Data
CO_2e		117.1	HHV	5,698	23,609	40 CFR 98 Subpart C
PM_{10}		0.0066	HHV	0.32	1.33	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$		0.0066	HHV	0.32	1.33	AP-42 Table 3.1-2a (4/00)
VOC	5.00	0.007	LHV	0.31	1.38	Vendor Data (20% of UHC)[4]
SO_2 (Maximum Hourly)		0.0571	HHV	2.78		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714	HHV		0.14	0.25 grains S / 100 scf
Formaldehyde		0.00071	HHV	0.03	0.14	AP-42 Table 3.1-3 (4/00)
Total HAPs		0.00103	HHV	0.05	0.21	AP-42 Table 3.1-3 (4/00)

1. Maximum hourly emission rate based on 0 °F.
2. Annual emission rate based on combination of potential operating modes as provided on following page for NOx, CO, and VOC. All other pollutants based on horsepower and brake specific fuel consumption.
3. HHV heat input based on HHV=1.11*LHV
4. VOC based on 20% of vendor data for unburned hydrocarbon (UHC).

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Solar Centaur 40 - Vendor Supplied Emission Rates

Operating Mode	Units	NO_x	CO	VOC
Normal Load @ 32 °F[1]	lb/hr	4.14	5.05	0.29
Low Temp (<0 to -20 °F)[2]	lb/hr	7.67	11.11	0.63
Very Low Temp (<-20 °F)[2]	lb/hr	21.90	16.67	0.63
Low-Load (<50%)[3]	lb/hr	7.51	304.73	3.48
Startup/ Shutdown[4]	lb/event	1.00	94.60	1.08

1. Based on data from Solar Centaur 40 Compressor Set data sheet and the following concentrations: 25 ppm NOx; 50 ppm CO; 5 ppm VOC
2. Based on data from Solar Product Information Letter (PIL) 167
3. Based on data provided by Solar for 40% load
4. Based on data from Solar PIL170

Potential Annual Emissions Per Turbine

Operating Mode	Operating Time		NO_x	CO	VOC
	Cycles	hr/yr	ton/yr	ton/yr	ton/yr
Normal Load @ 32 °F		8643	17.89	21.82	1.25
Low Temp (<0 to -20 °F)		50	0.19	0.28	0.02
Very Low Temp (<-20 °F)		0	0.00	0.00	0.00
Low-Load (<50%)		50	0.19	7.62	0.09
Startup/ Shutdown	50	17	0.03	2.37	0.03
Total		8,760	18.30	32.09	1.38

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Emissions from Venting - Solar Centaur 40

Number of Pneumatic Actuators:	6	
Pneumatic Actuator Vent Rate:	3	scf/cycle/actuator
Daily Cycles:	2	cycle/day
Number of Startup/Shutdown Cycles:	50	
Pneumatic Starter Emissions per Startup:	13,663	scf
Blowdown Emissions per Shutdown:	21,550	scf
Number of Dry Seals:	4	
Dry Seal Vent Rate:	0.5	scf/min/seal
Annual Operating Hours:	8760	

Component	Emission Rate								
	Total	CH_4[2]	CO_2[2]	CH_4[3]	CO_2[3]	CH_4	CO_2	CO_2e[4]	VOC[6]
Continuous During Operation	scf/hr	scf/hr	scf/hr	lb/hr	lb/hr	ton/yr	ton/yr	ton/yr	ton/yr
Dry Seals	120.00	111.90	1.19	4.74	0.14	20.75	0.60	519.26	0.80
Intermittent During Startup/Shutdown	scf/event	scf/event	scf/event	lb/event	lb/event	ton/yr	ton/yr	ton/yr	ton/yr
Pneumatic Actuator[1]	18.00	16.79	0.18	0.71	0.02	0.26	0.01	6.49	0.01
Pneumatic Starter[1]	13663.0	12740.7	135.3	539.3	15.7	13.5	0.4	337.5	0.52
Blowdowns[1,5]	21550.0	20095.4	213.3	850.6	24.7	21.3	0.6	532.3	0.82
							Total:	1395.5	2.16

1. Emission rates per event instead of per hour
2. CH_4 and CO_2 emission rates based on 93.25 vol% CH_4 and 0.99 vol% CO_2 in natural gas
3. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
4. Based on 40 CFR 98 Subpart A Global Warming Potentials
5. Conservative estimate based on 1 blowdown per shutdown. It is not expected that a blowdown will occur after each shutdown.
6. Based on a 0.039 ratio of VOC to methane as calculated from gas composition

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Fugitive Emissions from Leaks - Solar Centaur 40

Number of Compressors: 1
Annual Operating Hours: 8,760

Component	Average Number of Leaking Components[1]	Emission Factor[2]	Total Emission Rate (1 compressor)								
			Total	CH_4[3]	CO_2[3]	CH_4[4]	CO_2[4]	CH_4	CO_2	CO_2e[5]	VOC[6]
	component leaks / compressor	scf/hr / component	scf/hr	scf/hr	scf/hr	lb/hr	lb/hr	ton/yr	ton/yr	ton/yr	ton/yr
Compressor Service											
Valve	0.55	14.84	8.16	7.61	0.08	0.32	0.01	1.41	0.04	35.32	5.46E-02
Connector	0.62	5.59	3.47	3.23	0.03	0.14	0.00	0.60	0.02	15.00	2.32E-02
Open-Ended Line	0.16	17.27	2.76	2.58	0.03	0.11	0.00	0.48	0.01	11.96	1.85E-02
Pressure Relief Valve	0.00	39.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
Meter	0.00	19.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
Non-Compressor Service											
Valve	0.60	6.42	3.85	3.59	0.04	0.15	0.00	0.67	0.02	16.67	2.57E-02
Connector	0.82	5.71	4.68	4.37	0.05	0.18	0.01	0.81	0.02	20.26	3.13E-02
Open-Ended Line	0.59	11.27	6.65	6.20	0.07	0.26	0.01	1.15	0.03	28.77	4.44E-02
Pressure Relief Valve	0.12	2.01	0.24	0.22	0.00	0.01	0.00	0.04	0.00	1.04	1.61E-03
Meter	0.01	2.93	0.03	0.03	0.00	0.00	0.00	0.01	0.00	0.13	1.96E-04
							Total:	5.16	0.15	129	0.20

1. Estimated component leaks per compressor based on average measurements throughout the Columbia pipeline system
2. Emission factors from 40 CFR 98 Subpart W Table W-3
3. CH_4 and CO_2 emission rates based on 93.25 vol% CH_4 and 0.99 vol% CO_2 in natural gas
4. Conversion based on densities of GHG as provided in 40 CFR 98.233(v)
5. Based on 40 CFR 98 Subpart A Global Warming Potentials
6. Based on a 0.039 ratio of VOC to methane as calculated from gas composition.

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Waukesha Emergency Generator

Horsepower	530	HP
Brake Specific Fuel Consumption	8341	Btu/Bhp-hr
Total Heat Input	4.42	MMBtu/hr
Operating Hours	500	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	2.17	MMscf/yr
	4334	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	g/bhp-hr	lb/MMBtu	lb/hr	ton/yr	
NO_x	2.00		2.34	0.58	Vendor Data
CO	1.30		1.52	0.38	Vendor Data
CO_2e		117.0	517	129	40 CFR 98 Subpart C
PM_{10}		0.010	0.04	0.01	AP-42 Table 3.2-2 (7/00) - 4SLB
$PM_{2.5}$		0.010	0.04	0.01	AP-42 Table 3.2-2 (7/00) - 4SLB
VOC	0.26		0.30	0.08	Vendor Data
SO_2 (Maximum Hourly)		0.0571	0.25		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		7.89E-04	0.25 grains S / 100 scf
Formaldehyde		0.05280	0.23	0.06	AP-42 Table 3.2-2 (7/00) - 4SLB
Total HAPs		0.07220	0.32	0.08	AP-42 Table 3.2-2 (7/00) - 4SLB

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Ingersoll-Rand 412KVGB 4SLB Reciprocating Engines - To be moved to standby status

Horsepower	1500	HP
Maximum Horsepower	1650	HP
Brake Specific Fuel Consumption	9500	Btu/Bhp-hr
Total Heat Input	14.25	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	122.38	MMscf/yr
	13,971	scf/hr
Quantity	2	

Pollutant	Emission Factor	Emission Rate			Emission Factor Reference
	lb/MMBtu	lb/hr[1]	ton/yr (1 engine)	ton/yr (2 engines)	
NO_x	4.080	63.95	254.65	509.31	AP-42 Table 3.2-2 (7/00) - 4SLB
CO	0.317	4.97	19.79	39.57	AP-42 Table 3.2-2 (7/00) - 4SLB
CO_2e	117.0	1,834	7,303	14,606	40 CFR 98 Subpart C
PM_{10}	0.010	0.16	0.62	1.25	AP-42 Table 3.2-2 (7/00) - 4SLB
$PM_{2.5}$	0.010	0.16	0.62	1.25	AP-42 Table 3.2-2 (7/00) - 4SLB
VOC	0.118	1.85	7.36	14.73	AP-42 Table 3.2-2 (7/00) - 4SLB
SO_2 (Maximum Hourly)	0.0571	0.90			20 grains S / 100 scf
SO_2 (Average Annual)	0.000714		0.04	0.09	0.25 grains S / 100 scf
Formaldehyde	0.05280	0.83	3.30	6.59	AP-42 Table 3.2-2 (7/00) - 4SLB
Total HAPs	0.07220	1.13	4.51	9.01	AP-42 Table 3.2-2 (7/00) - 4SLB

1. Maximum hourly emission rate based on maximum horsepower under optimum conditions (10% greater than site rating).

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Solar Taurus 60 Turbine

Horsepower	6736 HP
Maximum Horsepower	7580 HP
Brake Specific Fuel Consumption	8,000 Btu/Bhp-hr
Total Heat Input	53.89 MMBtu/hr
Operating Hours	8760 hr/yr
Natural Gas Heat Content	1020 Btu/scf
Fuel Consumption	462.80 MMscf/yr
	52,831.4 scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMBtu (HHV)	lb/hp-hr	lb/hr[1]	ton/yr	
NO_x		7.97E-04	6.04	23.51	Vendor Data
CO		9.71E-04	7.36	28.66	Vendor Data
GHG (CO_2e)	117.0	0.94	7,095	27,616	40 CFR 98 Subpart C
PM_{10}	0.0066	5.28E-05	0.40	1.56	AP-42 Table 3.1-2a (4/00)
$PM_{2.5}$	0.0066	5.28E-05	0.40	1.56	AP-42 Table 3.1-2a (4/00)
VOC		2.86E-05	0.22	0.84	Vendor Data
SO_2 (Maximum Hourly)	0.0571	4.57E-04	3.46		20 grains S / 100 scf
SO_2 (Average Annual)	0.000714	5.712E-06		0.17	0.25 grains S / 100 scf
Formaldehyde	0.00071	5.680E-06	0.04	0.17	AP-42 Table 3.1-3 (4/00)
Total HAPs	0.00103	8.22E-06	0.06	0.24	AP-42 Table 3.1-3 (4/00)

1. Maximum hourly emission rate based on maximum horsepower under optimum conditions.

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Heating System Boiler

Heat Input	3.40	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	29.20	MMscf/yr
	3333.3	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.33	1.46	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.28	1.23	AP-42 Table 1.4-1 (7/98)
CO_2e		117.0	398	1,742	40 CFR 98 Subpart C
PM_{10}	7.6	0.007	0.03	0.11	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	0.03	0.11	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	0.02	0.08	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.19		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		1.06E-02	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	2.50E-04	1.10E-03	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	6.29E-03	2.76E-02	AP-42 Table 1.4-3 & 4 (7/98)

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Line Heater #1

Heat Input	0.25	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	2.15	MMscf/yr
	245.1	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.02	0.11	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.02	0.09	AP-42 Table 1.4-1 (7/98)
CO_2e		117.0	29	128	40 CFR 98 Subpart C
PM_{10}	7.6	0.007	1.86E-03	0.01	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	1.86E-03	0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	1.35E-03	0.01	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.01		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		7.82E-04	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	1.84E-05	8.05E-05	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	4.63E-04	2.03E-03	AP-42 Table 1.4-3 & 4 (7/98)

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Line Heater #2

Heat Input	0.50	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	4.29	MMscf/yr
	490.2	scf/hr

Pollutant	Emission Factor		Emission Rate		Emission Factor Reference
	lb/MMscf	lb/MMBtu	lb/hr	ton/yr	
NO_x	100	0.098	0.05	0.21	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.04	0.18	AP-42 Table 1.4-1 (7/98)
CO_2e		117.0	59	256	40 CFR 98 Subpart C
PM_{10}	7.6	0.007	3.73E-03	0.02	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	3.73E-03	0.02	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	2.70E-03	0.01	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.03		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		1.56E-03	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	3.68E-05	1.61E-04	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	9.26E-04	4.05E-03	AP-42 Table 1.4-3 & 4 (7/98)

Columbia Gas Transmission, LLC
Smithfield Compressor Station

Heater #3

Heat Input	0.30	MMBtu/hr
Operating Hours	8760	hr/yr
Natural Gas Heat Content	1020	Btu/scf
Fuel Consumption	2.58	MMscf/yr
	294.1	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	0.13	AP-42 Table 1.4-1 (7/98)
CO	84	0.082	0.02	0.11	AP-42 Table 1.4-1 (7/98)
CO_2e		117.0	35	154	40 CFR 98 Subpart C
PM_{10}	7.6	0.007	2.24E-03	0.01	AP-42 Table 1.4-2 (7/98)
$PM_{2.5}$	7.6	0.007	2.24E-03	0.01	AP-42 Table 1.4-2 (7/98)
VOC	5.5	0.005	1.62E-03	0.01	AP-42 Table 1.4-2 (7/98)
SO_2 (Maximum Hourly)		0.0571	0.02		20 grains S / 100 scf
SO_2 (Average Annual)		0.000714		9.38E-04	0.25 grains S / 100 scf
Formaldehyde	0.075	0.00007	2.21E-05	9.66E-05	AP-42 Table 1.4-3 (7/98)
Total HAPs	1.89	0.00185	5.55E-04	2.43E-03	AP-42 Table 1.4-3 & 4 (7/98)

Customer	
Columbia Pipeline Group	
Job ID: **Smithfield CS**	
Run By: **Trevor T Keeney**	Date Run: **19-Mar-15**
Engine Performance Code: **REV. 4.15.1.17.10**	Engine Performance Data: **REV. 3.1**

Model: **CENTAUR 40-4700S**	
Package Type: **CS/MD**	
Match: **HIGH AMBIENT**	
Fuel System: **GAS**	
Fuel Type: **CHOICE GAS**	

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	885
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	10.0
Accessory on GP Shaft	HP	15.5

		1	2	3	4	5
Engine Inlet Temperature	deg F	-20.0	0	20.0	40.0	60.0
Relative Humidity	%	60.0	60.0	60.0	60.0	60.0
Driven Equipment Speed	RPM	15475	15441	15462	15493	15500
Specified Load	HP	FULL	FULL	FULL	FULL	FULL
Net Output Power	HP	4549	4433	4309	4149	3981
Fuel Flow	mmBtu/hr	45.46	43.84	42.22	40.76	39.30
Heat Rate	Btu/HP-hr	9991	9889	9799	9824	9872
Therm Eff	%	25.466	25.729	25.965	25.901	25.774
Engine Exhaust Flow	lbm/hr	164668	159973	155114	149722	144251
PT Exit Temperature	deg F	738	751	770	797	823
Exhaust Temperature	deg F	738	751	770	797	823

Fuel Gas Composition (Volume Percent)

Methane (CH4)	90.69
Ethane (C2H6)	3.52
Propane (C3H8)	0.99
I-Butane (C4H10)	0.40
N-Butane (C4H10)	0.40
I-Pentane (C5H12)	0.15
N-Pentane (C5H12)	0.15
Hexane (C6H14)	0.08
Carbon Dioxide (CO2)	1.00
Nitrogen (N2)	2.52
Sulfur Dioxide (SO2)	0.0001
Neo-Pentane (C5H12)	0.10

Fuel Gas Properties

LHV (Btu/Scf)	946.9	Specific Gravity	0.6218	Wobbe Index at 60F	1200.8

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.

Customer: *Columbia Pipeline Group*	Model: **CENTAUR 40-4700S**
Job ID: **Smithfield CS**	Package Type: **CS/MD**
Run By: **Trevor T Keeney** / Date Run: **19-Mar-15**	Match: **HIGH AMBIENT**
Engine Performance Code: **REV. 4.15.1.17.10** / Engine Performance Data: **REV. 3.1**	Fuel System: **GAS**
	Fuel Type: **CHOICE GAS**

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	885
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	10.0
Accessory on GP Shaft	HP	15.5

		1	2	3	4	5	6
Engine Inlet Temperature	deg F	70.0	80.0	85.0	90.0	95.0	100.0
Relative Humidity	%	60.0	60.0	60.0	60.0	60.0	60.0
Driven Equipment Speed	RPM	15466	15431	15414	15340	15299	15261
Specified Load	HP	FULL	FULL	FULL	FULL	FULL	FULL
Net Output Power	HP	3885	3787	3729	3627	3549	3472
Fuel Flow	mmBtu/hr	38.61	37.91	37.57	36.89	36.42	35.95
Heat Rate	Btu/HP-hr	9938	10010	10075	10173	10262	10355
Therm Eff	%	25.602	25.418	25.255	25.012	24.795	24.572
Engine Exhaust Flow	lbm/hr	141015	137810	136034	133738	131813	129909
PT Exit Temperature	deg F	837	851	859	864	871	877
Exhaust Temperature	deg F	837	851	859	864	871	877

Fuel Gas Composition (Volume Percent)

Methane (CH4)	90.69
Ethane (C2H6)	3.52
Propane (C3H8)	0.99
I-Butane (C4H10)	0.40
N-Butane (C4H10)	0.40
I-Pentane (C5H12)	0.15
N-Pentane (C5H12)	0.15
Hexane (C6H14)	0.08
Carbon Dioxide (CO2)	1.00
Nitrogen (N2)	2.52
Sulfur Dioxide (SO2)	0.0001
Neo-Pentane (C5H12)	0.10

Fuel Gas Properties

LHV (Btu/Scf)	946.9	Specific Gravity	0.6218	Wobbe Index at 60F	1200.8

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.

3.1.2 GAS TURBINE PERFORMANCE DATA FOR PERMITTING

Customer: *Columbia Pipeline Group*	Model: CENTAUR 40-4700S
Job ID: Smithfield CS	Package Type: CS/MD
Run By: Trevor T Keeney / Date Run: 19-Mar-15	Match: HIGH AMBIENT
Engine Performance Code: REV. 4.15.1.17.10 / Engine Performance Data: REV. 3.1	Fuel System: GAS
	Fuel Type: CHOICE GAS

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	885
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	10.0
Accessory on GP Shaft	HP	15.5

		1	2	3	4
Engine Inlet Temperature	deg F	0	0	59.0	59.0
Relative Humidity	%	60.0	60.0	60.0	60.0
Driven Equipment Speed	RPM	12788	15441	12665	15500
Specified Load	HP	50.0%	FULL	50.0%	FULL
Net Output Power	HP	2217	4433	1995	3990
Fuel Flow	mmBtu/hr	32.56	43.84	29.85	39.37
Heat Rate	Btu/HP-hr	14690	9889	14963	9866
Therm Eff	%	17.321	25.729	17.005	25.791
Engine Exhaust Flow	lbm/hr	137352	159973	119125	144577
PT Exit Temperature	deg F	781	751	847	822
Exhaust Temperature	deg F	722	751	809	822

Fuel Gas Composition (Volume Percent)

Methane (CH4)	90.69
Ethane (C2H6)	3.52
Propane (C3H8)	0.99
I-Butane (C4H10)	0.40
N-Butane (C4H10)	0.40
I-Pentane (C5H12)	0.15
N-Pentane (C5H12)	0.15
Hexane (C6H14)	0.08
Carbon Dioxide (CO2)	1.00
Nitrogen (N2)	2.52
Sulfur Dioxide (SO2)	0.0001
Neo-Pentane (C5H12)	0.10

Fuel Gas Properties

LHV (Btu/Scf)	946.9	Specific Gravity	0.6218	Wobbe Index at 60F	1200.8

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.

3.1.5 EMISSIONS OUTPUT (GAS FUEL)

Customer: Columbia Pipeline Group	Engine Model: CENTAUR 40-4700S CS/MD HIGH AMBIENT
Job ID: Smithfield CS	
Inquiry Number: HO14-0132	Fuel Type: CHOICE GAS / Water Injection: NO
Run By: Trevor T Keeney / Date Run: 19-Mar-15	Engine Emissions Data: REV. 0.1

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 4433 HP 100.0% Load — Elev. 885 ft — Rel. Humidity 60.0% — Temperature 0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	19.28	23.48	6.72
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr)	1.33	1.62	0.46
(gas turbine shaft pwr) lbm/hr	4.40	5.36	1.53
2 — 4213 HP 100.0% Load — Elev. 885 ft — Rel. Humidity 60.0% — Temperature 32.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	18.15	22.10	6.33
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr)	1.32	1.61	0.46
(gas turbine shaft pwr) lbm/hr	4.14	5.05	1.45

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 typical SoLoNOx warranty, for ppm values, is available for greater than 0 deg F or -20 deg C, and between 50% and 100% load for gas, fuel, and between 65% and 100% load for liquid fuel (except f or the Centaur 40). An emission warranty for non-SoLoNOx equipment is available for greater than 0 deg F or -20 deg C and betwee
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.

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PIL 167
Product Information Letter

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 ≥ 0°F (–20°C). The *Titan*™ 250 is an exception, with a lower standard warranty at ≥ –20°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% O_2. 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% O_2. 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% O_2 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
Centaur 50	Gas Only	Gas	50 to 100% load	42	100	50
	Dual Fuel	Gas	50 to 100% load	72	100	50
Taurus™ 60	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Taurus 65	Gas Only	Gas	50 to 100% load	42	100	50
Taurus 70	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Mars® 90	Gas Only	Gas	50 to 100% load	42	100	50
Mars 100	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Titan 130	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Titan 250	Gas Only	Gas	40 to 100% load	25	50	25
	Gas Only	Gas	40 to 100% load	15	25	25
Centaur 50	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 60	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 70	Dual Fuel	Liquid	65 to 100% load	120	150	75
Mars 100	Dual Fuel	Liquid	65 to 100% load	120	150	75
Titan 130	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
Centaur 40	Gas Only or Dual Fuel	Gas	80 to 100% load	120	150	50
Centaur 50	Gas Only	Gas	50 to 100% load	120	150	50
	Dual Fuel	Gas	50 to 100% load	120	150	50
Taurus 60	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Taurus 65	Gas Only	Gas	50 to 100% load	120	150	50
Taurus 70	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Mars 90	Gas Only	Gas	80 to 100% load	120	150	50
Mars 100	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Titan 130	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Centaur 40	Dual Fuel	Liquid	80 to 100% load	120	150	75
Centaur 50	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 60	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 70	Dual Fuel	Liquid	65 to 100% load	120	150	75
Mars 100	Dual Fuel	Liquid	65 to 100% load	120	150	75
Titan 130	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
Titan 250	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% O_2 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 (T_1) above 0°F. With inlet air heating to keep T_1 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 (T_1) 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 NOx 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 NOx 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 NOx level of 150 ppm @ 15% O_2 for operating loads less than 75%.

Table 4 provides estimates of NOx, 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	NOx, ppm	CO, ppm	UHC, ppm
***Centaur* 40/50, *Taurus* 60/65/70, *Mars* 90/100, *Titan* 130**					
≥ –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
***Titan* 250**					
≥ –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
***Centaur* 50, *Taurus* 60/70, *Mars* 100, *Titan* 130**					
≥ –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
***Centaur* 40**					
≥ –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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PIL 168
Product Information Letter

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 (SO_2), 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, SO_2 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 SO_2. Since Solar does not control the amount of sulfur in the fuel, we are unable to predict SO_2 emissions without a site fuel composition analysis. Customers generally estimate SO_2 emissions with a mass balance calculation by assuming that any sulfur in the fuel will convert to SO_2. 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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PIL 170
Product Information Letter

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% load[1] 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 (NOx), 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).

Solar Turbines Incorporated
9330 Sky Park Court
San Diego, CA 92123-5398

[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	449
Total Emissions per Shutdown (lbs)	0.3	30.2	1.7	181	0.4	35.4	2.0	217	0.4	32.9	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	511	1.2	105.3	6.2	805	1.4	121.5	7.1	829	1.9	176.9	10.1	1,161	2.5	26.2	1.7	1,791
Total Emissions per Shutdown (lbs)	1.1	33.4	5.2	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.

Solar Turbines Estimated Emissions

Assumptions: pipeline nat gas gas, 32F, 0' MSL, 4" inlet/outlet losses, nominal perf.

Centaur 40S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	3.3	9600	358	960	20.5
40%	66	7.5	4400	305	440	17.4
Taurus 60S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	3.1	9600	337	960	19.3
40%	66	8.5	4400	345	440	19.7
Taurus 70S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	4.9	9600	531	960	30.3
40%	66	14.5	4400	586	440	33.5
Mars 90S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	5.2	9600	528	960	32.5
40%	66	14.3	4400	582	440	33.2
Mars 100S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	5.9	9600	636	960	36.4
40%	66	16.1	4400	653	440	37.3
Titan 130S						
Load	NOx ppm	NOx lb/hr	CO ppm	CO lb/hr	UHC ppm	UHC lb/hr
10%	54	7.5	9600	825	960	45.2
40%	66	21.0	4400	851	440	48.6

Attachment O

Monitoring / Recordkeeping / Reporting / Testing Plans

Monitoring/Recordkeeping/Reporting/Testing Plans

Turbine E06

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

1) Monthly operating hours,
2) Monthly operating hours at less than 50% load,
3) Monthly operating hours at less than 0 to -20°F ambient temperature, and
4) Monthly number of startup and shutdown cycles.

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

$ME_{Px} = N_{Px} * N\ hrs + LL_{Px} * LL\ hrs + LT_{Px} * LT\ hrs + SS_{Px} * SS\ cycles$

where:

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

The unit emission rates for each pollutant during N, LL, LT, and SS operation are summarized in the following table.

Operating Mode	Units	NO_x	CO	VOC	SO_2[1,2]	PM
Full Load @ 32 °F	lb/hr	4.14	5.05	0.29	0.03	0.30
Low-Temp Operation (< 0 to -20 °F)	lb/hr	7.67	11.11	0.63	0.03	0.30
Low-Load Operation (< 50%)	lb/hr	7.51	304.73	3.48	0.03	0.30
Startup/Shutdown	lb/event[3]	1.00	94.60	1.08	0.01	0.10

[1] Based on typical U.S. gas quality of 0.25 gr/100 scf.
[2] Based on annual average potential to emit.
[3] Sum of expected shutdown and startup lb/event emissions.

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

To demonstrate compliance with Subpart KKKK, 40 CFR §60.4400, an initial NO_x performance test using EPA reference methods is required. Therefore, Columbia will conduct an initial compliance test within 60 days after achieving full-load operation or within 180 days of startup if the turbines are not operated at full load. Unless continuous parameter monitoring is implemented by Columbia, annual performance testing using EPA reference methods will be conducted within 14 calendar months following the previous performance test. Columbia will reduce the test frequency to biennial if measured NO_x emissions are less than 75% of limit. Columbia requests that portable emissions analyzers be approved

for annual turbine testing. In addition, the station will continuously monitor the turbine to document any periods during which the SoLoNOx system is not in service (e.g., during startup, shutdown, low-load, or a system malfunction). Records of turbine startup, shutdown, SoLoNOx malfunction, and/or SoLoNOx monitoring system malfunction will be recorded per Subpart KKKK and NSPS General Provisions in 40 CFR 60.7(b)&(c). Compliance with the SO_2 and fuel sulfur content limits can be demonstrated by monitoring natural gas sulfur content annually. However, per 40 CFR 60.4365(a), Columbia will exempt the proposed turbines from periodic monitoring by demonstrating compliance with the FERC tariff limit on total sulfur content of 20 grains of sulfur per 100 standard cubic feet.

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 compression station located on State Route 20, Smithfield, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39° 28' 49.82" N and 80° 32' 17.26" W.

The applicant estimates the increases in, if modification application is approved, potential to discharge the following Regulated Air Pollutants will be: Carbon Monoxide by 32.09 tons per year, Nitrogen Oxides by 18.30 tons per year, PM10 and PM2.5 by 1.33 tons per year, Sulfur Dioxide by 0.14 tons per year, Volatile Organic Compounds (VOC) by 3.54 tons per year, Carbon Dioxide Equivalents (CO2e) by 25,004 tons per year, and Formaldehyde by 0.14 tons per year.

Startup of operation is planned to begin on or about the 1st day of October, 2016. 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 5th day of June, 2015.

By: Columbia Gas Transmission LLC
Glenn Fyola
Manager of Operations
950 Manifold Road
Washington, PA 15301

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

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:

☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR15)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS (Subpart(s) KKKK)	☒ Section 112(d) MACT standards (Subpart(s) YYYY)
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ Compliance Assurance Monitoring (40CFR64) [1]
☐ NO_x Budget Trading Program Non-EGUs (45CSR1)	☐ NO_x Budget Trading Program EGUs (45CSR26)

[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:

This regulation does not apply because none of the proposed equipment use add-on emission controls.

2. Non Applicability Determinations

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.

N/A

☒ **Permit Shield Requested** *(not applicable to Minor Modifications)*

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
NO_x	18.30
CO	32.09
VOC	3.54
PM_{10}	1.33
SO_2	0.14
Formaldehyde	0.14

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): _____ *(Please use blue ink)* Date: 6 / 01 / 15 *Please use blue ink)*

Named (typed): **Glenn Fyola** Title: **Operations Manager**

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

☐	Compliance Assurance Monitoring Form(s)
☐	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.