



Permit / Application Information Sheet
Division of Environmental Protection
West Virginia Office of Air Quality

Company:	Atlantic Coast Pipeline, LLC		Facility:	Marts Comp Station	
Region:	8	Plant ID:	041-00076	Application #:	13-3271
Engineer:	Kessler, Joe		Category:		
Physical Address:	US19-S/Gooseman Rd/ Kincheloe to Hollick West Milford WV		SIC: [4922] ELECTRIC, GAS AND SANITARY SERVICES - NATURAL GAS TRANSMISSION NAICS: [486210] Pipeline Transportation of Natural Gas		
County:	Lewis				
Other Parties:	ENV_MGR - Scarpinato, William 804-273-3049 VICE PRES - Hartz, Leslie 804-771-4468				

Information Needed for Database and AIRS
1. Need valid physical West Virginia address with zip
2. Air Program
3. Inspection result
4. Pollutant and class

Regulated Pollutants		
CO	Carbon Monoxide	74.440 TPY
	Formaldehyde	3.590 TPY
PM10	Particulate Matter < 10 um	43.280 TPY
SO2	Sulfur Dioxide	7.110 TPY
VOC	Volatile Organic Compounds (Reactive organic gases)	56.260 TPY
PM2.5	Particulate Matter < 2.5 um	43.280 TPY
PT	Total Particulate Matter	43.280 TPY
VHAP	VOLATILE ORGANIC HAZARDOUS AIR POLLUTANT	6.710 TPY
NOX	Nitrogen Oxides (including NO, NO2, NO3, N2O3, N2O4, and N2O5)	44.460 TPY

Summary from this Permit 13-3271		
Air Programs	Applicable Regulations	
MACT		
NSPS		
TITLE V		
Synthetic Minor		
Synthetic Minor for Title V		
Fee Program	Fee	Application Type
8D	\$4,500.00	CONSTRUCTION

Notes from Database
 Permit Note: Construction of a compressor station utilizing four Combustion Turbines.

NOTICE

Activity Dates	
APPLICATION RECEIVED	09/17/2015
ASSIGNED DATE	09/18/2015
APPLICANT PUBLISHED LEGAL AD	09/26/2015
APPLICATION INCOMPLETE	10/15/2015
APPLICATION FEE PAID	10/28/2015 4500
ADDITIONAL INFO RECEIVED	11/20/2015
APPLICATION DEEMED COMPLETE	02/25/2016

NON-CONFIDENTIAL

Please note, this information sheet is not a substitute for file research and is limited to data entered into the AIRTRAX database.

Company ID: 041-00076
 Company: Atlantic Coast Pipeline, LLC
 Printed: 05/11/2016
 Engineer: Kessler, Joe

IPR FILE INDEX

Applicant : Atlantic Coast Pipeline, LLC
Facility : Marts Compressor Station

Plant ID No.: 041-00076
R13-3271

Chronological Order - Add Index Pages As Necessary

Date	To	From	Subject	# of pages
9/18/15	ACP	Sandra Adkins	48-Hour Letter	
10/15/15	ACP	Joe Kessler	Incompleteness Letter	
10/20/15	Joe Kessler	ACP	Affidavit of Publication	
10/28/15	Joe Kessler	ACP	Fee	
11/20/15	Joe Kessler	ACP	Additional Information	
11/23/15	Joe Kessler	ACP	Revised Permit Application	
2/25/16	ACP	Joe Kessler	Completeness Determination	
5/5/16	Joe Kessler	ACP	Answers to Additional Questions	
5/19/16	File	Joe Kessler	DAQ/ACP E-mails	
5/19/16	File	Joe Kessler	Draft Permit R13-3271, Evaluation/Fact Sheet, Tracking Manifest	
5/23/16	Various	Sandra Adkins	Public Notice Documents	

JRK
5/23/16

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On September 17, 2015, Atlantic Coast Pipeline, LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to construct and operate the Marts Compressor Station located approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road), Lewis County, WV at latitude 39.13944 and longitude -80.46556. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as R13-2371.

The following potential emissions will be authorized by this permit action: Particulate Matter less than 2.5 microns, 43.28 tons per year (TPY); Particulate Matter less than 10 microns, 43.28 TPY; Particulate Matter, 43.28 TPY; Sulfur Dioxide, 7.11 TPY; Oxides of Nitrogen, 44.46 TPY; Carbon Monoxide, 74.44 TPY; Volatile Organic Compounds, 56.26 TPY; Hazardous Air Pollutants, 6.71 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on XXXXX. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed construction will meet all State and Federal air quality requirements. The purpose of the public review process is to accept public comments on air quality issues relevant to this determination. Only written comments received at the address noted below within the specified time frame, or comments presented orally at a scheduled public meeting, will be considered prior to final action on the permit. All such comments will become part of the public record.

Joe Kessler, PE
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1219
FAX: 304/926-0478

Entire Document
NON-CONFIDENTIAL

Additional information, including copies of the draft permit, application and all other supporting materials relevant to the permit decision may be obtained by contacting the engineer listed above. The draft permit and engineering evaluation can be downloaded at:

www.dep.wv.gov/daq/Pages/NSRPermitsforReview.aspx

Kessler, Joseph R

From: Adkins, Sandra K
Sent: Friday, May 20, 2016 11:54 AM
To: Legals
Cc: Kessler, Joseph R
Subject: Publication of Class I Legal Ad for the WV Division of Air Quality

Please publish the information below as a Class I legal advertisement (one time only) in the Tuesday, May 24, 2016, issue of *The Exponent/Telegram* (Account 27207). Please let me know that this has been received and will be published as requested. Thank you.

Send the invoice for payment and affidavit of publication to:

Sandra Adkins

**WV Department of Environmental Protection
DIVISION OF AIR QUALITY**

601- 57th Street

Charleston, WV 25304

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On September 17, 2015, Atlantic Coast Pipeline, LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to construct and operate the Marts Compressor Station located approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road), Lewis County, WV at latitude 39.13944 and longitude -80.46556. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as R13-2371.

The following potential emissions will be authorized by this permit action: Particulate Matter less than 2.5 microns, 43.28 tons per year (TPY); Particulate Matter less than 10 microns, 43.28 TPY; Particulate Matter, 43.28 TPY; Sulfur Dioxide, 7.11 TPY; Oxides of Nitrogen, 44.46 TPY; Carbon Monoxide, 74.44 TPY; Volatile Organic Compounds, 56.26 TPY; Hazardous Air Pollutants, 6.71 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on Thursday, June 23, 2016. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed construction will meet all State and Federal air quality requirements. The purpose of the public review process is to accept public comments on air quality issues relevant to this determination. Only written comments received at the address noted below within the specified time frame, or comments presented orally at a scheduled public meeting, will be considered prior to final action on the permit. All such comments will become part of the public record.

Joe Kessler, PE
WV Department of Environmental Protection
Division of Air Quality

601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1219
FAX: 304/926-0478

Additional information, including copies of the draft permit, application and all other supporting materials relevant to the permit decision may be obtained by contacting the engineer listed above. The draft permit and engineering evaluation can be downloaded at:

www.dep.wv.gov/daq/Pages/NSRPermitsforReview.aspx

Kessler, Joseph R

From: Adkins, Sandra K
Sent: Friday, May 20, 2016 11:59 AM
To: Kessler, Joseph R
Subject: RE: R13-3271 Public Notice

Regarding the email to EPA, do you want the Appendix and Attachments to be included?

From: Kessler, Joseph R
Sent: Friday, May 20, 2016 10:59 AM
To: Adkins, Sandra K <Sandra.K.Adkins@wv.gov>
Subject: R13-3271 Public Notice

R13-3271
Atlantic Coast Pipeline, LLC
Marts Compressor Station
041-00076

Please fill in end of notice date when you know it.

Thanks

Joe Kessler, PE
Engineer
West Virginia Division of Air Quality
601-57th St., SE
Charleston, WV 25304
Phone: (304) 926-0499 x1219
Fax: (304) 926-0478
Joseph.r.kessler@wv.gov

Kessler, Joseph R

From: Adkins, Sandra K
Sent: Monday, May 23, 2016 9:14 AM
To: Wheeler, Cathy L
Cc: Kessler, Joseph R
Subject: DAQ Public Notice

Please see below the Public Notice for Draft Permit R13-3271 for Atlantic Coast Pipeline, LLC's Marts Compressor Station to be located in Lewis County.

The notice will be published in *The Exponent/Telegram* on Tuesday, May 24, 2016, and the thirty day public comment period will end on Thursday, June 23, 2016.

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On September 17, 2015, Atlantic Coast Pipeline, LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to construct and operate the Marts Compressor Station located approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road), Lewis County, WV at latitude 39.13944 and longitude -80.46556. A preliminary evaluation has determined that all State and Federal air quality requirements will be met by the proposed facility. The DAQ is providing notice to the public of its preliminary determination to issue the permit as R13-2371.

The following potential emissions will be authorized by this permit action: Particulate Matter less than 2.5 microns, 43.28 tons per year (TPY); Particulate Matter less than 10 microns, 43.28 TPY; Particulate Matter, 43.28 TPY; Sulfur Dioxide, 7.11 TPY; Oxides of Nitrogen, 44.46 TPY; Carbon Monoxide, 74.44 TPY; Volatile Organic Compounds, 56.26 TPY; Hazardous Air Pollutants, 6.71 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on Thursday, June 23, 2016. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed construction will meet all State and Federal air quality requirements. The purpose of the public review process is to accept public comments on air quality issues relevant to this determination. Only written comments received at the address noted below within the specified time frame, or comments presented orally at a scheduled public meeting, will be considered prior to final action on the permit. All such comments will become part of the public record.

Joe Kessler, PE
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1219
FAX: 304/926-0478

Additional information, including copies of the draft permit, application and all other supporting materials relevant to the permit decision may be obtained by contacting the engineer listed above. The draft permit and engineering evaluation can be downloaded at:

www.dep.wv.gov/daq/Pages/NSRPermitsforReview.aspx

Kessler, Joseph R

From: Adkins, Sandra K
Sent: Monday, May 23, 2016 9:14 AM
To: 'wentworth.paul@epa.gov'; 'bradley.megan@epa.gov'; wiliam.a.scarpinato@dom.com
Cc: Durham, William F; McKeone, Beverly D; McCumbers, Carrie; Hammonds, Stephanie E; Rice, Jennifer L; Kessler, Joseph R; Taylor, Danielle R
Subject: WV Draft Permit R13-3271 for Atlantic Coast Pipeline, LLC; Marts Compressor Station
Attachments: 3271.pdf; Eval3271.pdf; Attachment A.pdf; Attachment B.pdf; Appendix A.pdf; notice.pdf

Please find attached the Draft Permit R13-3271, Engineering Evaluation, Attachment A and B, Appendix A, and Public Notice for Atlantic Coast Pipeline, LLC's Marts Compressor Station to be located in Lewis County.

The notice will be published in *The Exponent Telegram* on Tuesday, May 24, 2016, and the thirty day comment period will end on Thursday, June 23, 2016.

Should you have any questions or comments, please contact the permit writer, Joe Kessler, at 304 926-0499 x1219.

Kessler, Joseph R

From: Kersey, David
Sent: Monday, May 23, 2016 9:00 AM
To: Kersey, David
Subject: KRONOS is unavailable

KRONOS is unavailable. When it comes up, we will let everyone know.

DEP Leave and Payroll Team

West Virginia Department of Environmental Protection

*Earl Ray Tomblin
Governor*

Division of Air Quality

*Randy C. Huffman
Cabinet Secretary*

Permit to Construct



R13-3271

This permit is issued in accordance with the West Virginia Air Pollution Control Act (West Virginia Code §§ 22-5-1 et seq.) and 45 C.S.R. 13 — Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation. The permittee identified at the facility listed below is authorized to construct the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Issued to:

Atlantic Coast Pipeline, LLC
Marts Compressor Station
041-00176

Entire Document
NON-CONFIDENTIAL

DRAFT

William F. Durham
Director

Issued: **DRAFT**

Facility Location: Near Jane Lew, Lewis County, West Virginia
Mailing Address: 707 Main Street, Richmond, VA 23219
Facility Description: Compressor Station
SIC/NAICS Code: 4922/486210
UTM Coordinates: 545.53 km Easting • 4,332.66 km Northing • Zone 17
Latitude/Longitude: 39.13944/-80.46556
Permit Type: Construction
Desc. of Change: Construction of a natural gas compressor station utilizing combustion turbines..

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

As a result of this permit, the source is a nonmajor or area source subject to 45CSR30. Therefore, the facility is not subject to the permitting requirements of 45CSR30 and is classified as a deferred source.

Table of Contents

1.0. Emission Units	3
2.0. General Conditions	4
2.1. Definitions	4
2.2. Acronyms	4
2.3. Authority	5
2.4. Term and Renewal	5
2.5. Duty to Comply	5
2.6. Duty to Provide Information	5
2.7. Duty to Supplement and Correct Information	6
2.8. Administrative Permit Update	6
2.9. Permit Modification	6
2.10. Major Permit Modification	6
2.11. Inspection and Entry	6
2.12. Emergency	6
2.13. Need to Halt or Reduce Activity Not a Defense	7
2.14. Suspension of Activities	7
2.15. Property Rights	7
2.16. Severability	8
2.17. Transferability	8
2.18. Notification Requirements	8
2.19. Credible Evidence	8
3.0. Facility-Wide Requirements	9
3.1. Limitations and Standards	9
3.2. Monitoring Requirements	9
3.3. Testing Requirements	10
3.4. Recordkeeping Requirements	11
3.5. Reporting Requirements	11
4.0. Source-Specific Requirements	13
4.1. Limitations and Standards	13
4.2. Monitoring Requirements	18
4.3. Testing Requirements	20
4.4. Recordkeeping Requirements	21
CERTIFICATION OF DATA ACCURACY	23

1.0 Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device ⁽¹⁾
CT-01	CT-01	Solar Titan 130-20502S Turbine	2018	20,500 bhp (170.0 mmBtu/hr)	SCR Ox-Cat
CT-02	CT-02	Solar Mars 100-16000S Turbine	2018	15,900 bhp (140.0 mmBtu/hr)	SCR Ox-Cat
CT-03	CT-03	Solar Taurus 70-10802S Turbine	2018	10,915 bhp (140.0 mmBtu/hr)	SCR Ox-Cat
CT-04	CT-04	Solar Taurus 60-7800S Turbine	2018	7,700 bhp (71.4 mmBtu/hr)	SCR Ox-Cat
EG-01	EG-01	Caterpillar 4SLB G3516C Emergency Generator	2018	2,098 bhp	None
WH-1	WH-1	Boiler	2018	10.7 mmBtu/hr	None
TK-1	TK-1	Pipeline Liquids Tank	2018	2,500 gallons	None
TK-2	TK-2	Waste Oil Tank	2018	2,000 gallons	None
TK-3	TK-3	Ammonia Tank	2018	8,000 gallons	None
LR-1	LR-1	Tank Unloading Operations	2018	90 gallons/min	None

(1) SCR = Selective Catalytic Reduction; OxCat = Oxidation Catalyst

2.0. General Conditions

2.1. Definitions

- 2.1.1. All references to the "West Virginia Air Pollution Control Act" or the "Air Pollution Control Act" mean those provisions contained in W.Va. Code §§ 22-5-1 to 22-5-18.
- 2.1.2. The "Clean Air Act" means those provisions contained in 42 U.S.C. §§ 7401 to 7671q, and regulations promulgated thereunder.
- 2.1.3. "Secretary" means the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W.Va. Code §§ 22-1-6 or 22-1-8 (45 CSR § 30-2.12.). The Director of the Division of Air Quality is the Secretary's designated representative for the purposes of this permit.

2.2. Acronyms

CAAA	Clean Air Act Amendments	NO _x	Nitrogen Oxides
CBI	Confidential Business Information	NSPS	New Source Performance Standards
CEM	Continuous Emission Monitor	PM	Particulate Matter
CES	Certified Emission Statement	PM _{2.5}	Particulate Matter less than 2.5µm in diameter
C.F.R. or CFR	Code of Federal Regulations	PM ₁₀	Particulate Matter less than 10µm in diameter
CO	Carbon Monoxide	Ppb	Pounds per Batch
C.S.R. or CSR	Codes of State Rules	pph	Pounds per Hour
DAQ	Division of Air Quality	ppm	Parts per Million
DEP	Department of Environmental Protection	Ppmv or ppmv	Parts per million by volume
dscm	Dry Standard Cubic Meter	PSD	Prevention of Significant Deterioration
FOIA	Freedom of Information Act	psi	Pounds per Square Inch
HAP	Hazardous Air Pollutant	SIC	Standard Industrial Classification
HON	Hazardous Organic NESHAP	SIP	State Implementation Plan
HP	Horsepower	SO ₂	Sulfur Dioxide
lbs/hr	Pounds per Hour	TAP	Toxic Air Pollutant
LDAR	Leak Detection and Repair	TPY	Tons per Year
M	Thousand	TRS	Total Reduced Sulfur
MACT	Maximum Achievable Control Technology	TSP	Total Suspended Particulate
MDHI	Maximum Design Heat Input	USEPA	United States Environmental Protection Agency
MM	Million	UTM	Universal Transverse Mercator
MMBtu/hr or mmbtu/hr	Million British Thermal Units per Hour	VEE	Visual Emissions Evaluation
MMCF/hr or mmcf/hr	Million Cubic Feet per Hour	VOC	Volatile Organic Compounds
NA	Not Applicable	VOL	Volatile Organic Liquids
NAAQS	National Ambient Air Quality Standards		
NESHAPS	National Emissions Standards for Hazardous Air Pollutants		

2.3. Authority

This permit is issued in accordance with West Virginia Air Pollution Control Law W.Va. Code §§22-5-1 et seq. and the following Legislative Rules promulgated thereunder:

- 2.3.1. 45CSR13 – *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits and Procedures for Evaluation.*

2.4. Term and Renewal

- 2.4.1. This permit shall remain valid, continuous and in effect unless it is revised, suspended, revoked or otherwise changed under an applicable provision of 45CSR13 or any applicable legislative rule.

2.5. Duty to Comply

- 2.5.1. The permitted facility shall be constructed and operated in accordance with the plans and specifications filed in Permit Applications R13-3271 and any modifications, administrative updates, or amendments thereto. The Secretary may suspend or revoke a permit if the plans and specifications upon which the approval was based are not adhered to;
[45CSR§§13-5.11 and 13-10.3]
- 2.5.2. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the West Virginia Code and the Clean Air Act and is grounds for enforcement action by the Secretary or USEPA;
- 2.5.3. Violations of any of the conditions contained in this permit, or incorporated herein by reference, may subject the permittee to civil and/or criminal penalties for each violation and further action or remedies as provided by West Virginia Code 22-5-6 and 22-5-7;
- 2.5.4. Approval of this permit does not relieve the permittee herein of the responsibility to apply for and obtain all other permits, licenses and/or approvals from other agencies; i.e., local, state and federal, which may have jurisdiction over the construction and/or operation of the source(s) and/or facility herein permitted.

2.6. Duty to Provide Information

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

2.7. Duty to Supplement and Correct Information

Upon becoming aware of a failure to submit any relevant facts or a submittal of incorrect information in any permit application, the permittee shall promptly submit to the Secretary such supplemental facts or corrected information.

2.8. Administrative Update

The permittee may request an administrative update to this permit as defined in and according to the procedures specified in 45CSR13.

[45CSR§13-4]

2.9. Permit Modification

The permittee may request a minor modification to this permit as defined in and according to the procedures specified in 45CSR13.

[45CSR§13-5.4.]

2.10. Major Permit Modification

The permittee may request a major modification as defined in and according to the procedures specified in 45CSR14 or 45CSR19, as appropriate.

[45CSR§13-5.1]

2.11. Inspection and Entry

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

- a. At all reasonable times (including all times in which the facility is in operation) enter upon the permittee's premises where a source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times (including all times in which the facility is in operation) any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;
- d. Sample or monitor at reasonable times substances or parameters to determine compliance with the permit or applicable requirements or ascertain the amounts and types of air pollutants discharged.

2.12. Emergency

- 2.12.1. An "emergency" means any situation arising from sudden and reasonable unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission

limitation under the permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

- 2.12.2. Effect of any emergency. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the conditions of Section 2.12.3 are met.
- 2.12.3. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:
- a. An emergency occurred and that the permittee can identify the cause(s) of the emergency;
 - b. The permitted facility was at the time being properly operated;
 - c. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and,
 - d. The permittee submitted notice of the emergency to the Secretary within one (1) working day of the time when emission limitations were exceeded due to the emergency and made a request for variance, and as applicable rules provide. This notice must contain a detailed description of the emergency, any steps taken to mitigate emission, and corrective actions taken.
- 2.12.4. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
- 2.12.5. The provisions of this section are in addition to any emergency or upset provision contained in any applicable requirement.

2.13. Need to Halt or Reduce Activity Not a Defense

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

2.14. Suspension of Activities

In the event the permittee should deem it necessary to suspend, for a period in excess of sixty (60) consecutive calendar days, the operations authorized by this permit, the permittee shall notify the Secretary, in writing, within two (2) calendar weeks of the passing of the sixtieth (60) day of the suspension period.

2.15. Property Rights

This permit does not convey any property rights of any sort or any exclusive privilege.

2.16. Severability

The provisions of this permit are severable and should any provision(s) be declared by a court of competent jurisdiction to be invalid or unenforceable, all other provisions shall remain in full force and effect.

2.17. Transferability

This permit is transferable in accordance with the requirements outlined in Section 10.1 of 45CSR13. [45CSR§13-10.1]

2.18. Notification Requirements

The permittee shall notify the Secretary, in writing, no later than thirty (30) calendar days after the actual startup of the operations authorized under this permit.

2.19. Credible Evidence

Nothing in this permit shall alter or affect the ability of any person to establish compliance with, or a violation of, any applicable requirement through the use of credible evidence to the extent authorized by law. Nothing in this permit shall be construed to waive any defense otherwise available to the permittee including, but not limited to, any challenge to the credible evidence rule in the context of any future proceeding.

3.0. Facility-Wide Requirements

3.1. Limitations and Standards

- 3.1.1. **Open burning.** The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45CSR§6-3.1.
[45CSR§6-3.1.]
- 3.1.2. **Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.
[45CSR§6-3.2.]
- 3.1.3. **Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them.
[40CFR§61.145(b) and 45CSR§34]
- 3.1.4. **Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.
[45CSR§4-3.1 State-Enforceable only.]
- 3.1.5. **Permanent shutdown.** A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.
[45CSR§13-10.5.]
- 3.1.6. **Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45 C.S.R. 11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

- 3.2.1. **Emission Limit Averaging Time.** Unless otherwise specified, compliance with all annual limits shall be based on a rolling twelve month total. A rolling twelve month total shall be the sum of the measured parameter of the previous twelve calendar months. Compliance with all hourly emission limits shall be based on the applicable NAAQS averaging times or, where applicable, as given in any approved performance test method.

3.3. Testing Requirements

- 3.3.1. **Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:
- a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4 or 45CSR§13-5.4 as applicable.
 - b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.a. of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4 or 45CSR§13-5.4 as applicable.
 - c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.
 - d. The permittee shall submit a report of the results of the stack test within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives. The report shall include the following: the certification described in paragraph 3.5.1.; a statement of compliance status, also signed by a responsible official; and, a summary of conditions which form the basis for the compliance status evaluation. The summary of conditions shall include the following:

1. The permit or rule evaluated, with the citation number and language;
2. The result of the test for each permit or rule condition; and,
3. A statement of compliance or noncompliance with each permit or rule condition.

[WV Code § 22-5-4(a)(14-15) and 45CSR13]

3.4. Recordkeeping Requirements

- 3.4.1. **Retention of records.** The permittee shall maintain records of all information (including monitoring data, support information, reports and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent two (2) years of data shall be maintained on site. The remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.
- 3.4.2. **Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.
[45CSR§4. *State-Enforceable only.*]

3.5. Reporting Requirements

- 3.5.1. **Responsible official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.
- 3.5.2. **Confidential information.** A permittee may request confidential treatment for the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31.
- 3.5.3. **Correspondence.** All notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

If to the DAQ:

Director
WVDEP
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345

If to the USEPA:

Associate Director
Office of Air Enforcement and Compliance
Assistance Review (3AP20)
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

3.5.4. Operating Fee.

- 3.5.4.1. In accordance with 45CSR30 – Operating Permit Program, the permittee shall submit a Certified Emissions Statement (CES) and pay fees on an annual basis in accordance with the submittal requirements of the Division of Air Quality. A receipt for the appropriate fee shall be maintained on the premises for which the receipt has been issued, and shall be made immediately available for inspection by the Secretary or his/her duly authorized representative.
- 3.5.4.2. In accordance with 45CSR30 – Operating Permit Program, enclosed with this permit is a Certified Emissions Statement (CES) Invoice, from the date of initial startup through the following June 30. Said invoice and the appropriate fee shall be submitted to this office no later than 30 days prior to the date of initial startup. For any startup date other than July 1, the permittee shall pay a fee or prorated fee in accordance with the Section 4.5 of 45CSR22. A copy of this schedule may be found attached to the Certified Emissions Statement (CES) Invoice.
- 3.5.5. **Emission inventory.** At such time(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emissions from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal requirements of the Division of Air Quality. After the initial submittal, the Secretary may, based upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

4.0. Source-Specific Requirements

4.1. Limitations and Standards

4.1.1. Only those emission units/sources as identified in Table 1.0, with the exception of any *de minimis* sources as identified under Table 45-13B of 45CSR13, are authorized at the permitted facility by this permit. In accordance with the information filed in Permit Application R13-3271, the emission units/sources identified under Table 1.0 of this permit shall be installed, maintained, and operated so as to minimize any fugitive escape of pollutants, shall not exceed the listed maximum design capacities, shall use the specified control devices, and comply with any other information provided under Table 1.0.

4.1.2. Combustion Turbines

The combustion turbines (CTs), identified as CT-1 through CT-4, shall meet the following requirements:

- a. Each authorized CT shall be the make, model, and size as specified under Table 1.0 and shall only be fired by pipeline-quality natural gas;
- b. With the exception of operation during “low-temperature mode” and “low-load mode” as defined under 4.2.1(a), at all times each CT is in operation, each unit shall utilize SoLoNO_x dry low-NO_x combustor technology;
- c. With the exception of “low-load mode” as defined under 4.2.1(a), at all times each CT is in operation, each unit shall be controlled by Selective Catalytic Reduction (SCR) for control of NO_x emissions and shall utilize an oxidation catalyst for control of CO and unburnt hydrocarbon (UHC) emissions;
- d. Each CT shall be fired using good combustion practices;
- e. The maximum emissions from each CT shall not exceed the limits (during specific operational scenarios) as given in Appendix A; and
- f. **40 CFR 60, Subpart KKKK**
 The CTs shall meet all applicable requirements under 40 CFR 60, Subpart KKKK including the following:

(1) **What emission limits must I meet for nitrogen oxides (NO_x)?**

(i) You must meet the emission limits for NO_x specified in Table 1 to this subpart.
 [40 CFR§60.4320(a)]

(ii) **Table 1 to Subpart KKKK of Part 60—Nitrogen Oxide Emission Limits for New Stationary Combustion Turbines**

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO _x emission standard
New turbine firing natural gas	50 MMBtu/h and 850 MMBtu/h	25 ppm at 15 percent O ₂ or 150 ng/J of useful output (1.2 lb/MWh).

[40 CFR60, Subpart KKKK, Table 1]

(2) **What emission limits must I meet for sulfur dioxide (SO₂)?**

(ii) If your turbine is located in a continental area, you must comply with either paragraph (a)(1), (a)(2), or (a)(3) of this section. If your turbine is located in Alaska, you do not have to comply with the requirements in paragraph (a) of this section until January 1, 2008.

[40 CFR§60.4330(a)]

(A) You must not cause to be discharged into the atmosphere from the subject stationary combustion turbine any gases which contain SO₂ in excess of 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross output;

[40 CFR§60.4330(a)(1)]

(B) You must not burn in the subject stationary combustion turbine any fuel which contains total potential sulfur emissions in excess of 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input. If your turbine simultaneously fires multiple fuels, each fuel must meet this requirement.

[40 CFR§60.4330(a)(2)]

4.1.3. **Emergency Generator**

The emergency generator, identified as EG-01, shall meet the following requirements:

- a. The unit shall be a 2,098 hp 4-Stroke Lean Burn (4SLB) Caterpillar G3516C Emergency Generator (1,500 kWe), shall only be fired by pipeline-quality natural gas, and shall not operate in excess of 100 hours per year;
- b. The maximum emissions from the Emergency Generator shall not exceed the limits given in the following table:

Table 4.1.3(b): Emergency Generator Emission Limits

Pollutant	PPH	TPY
CO	9.02	0.45
NO_x	2.31	0.12
VOC	4.86	0.24
Formaldehyde	2.41	0.12

c. **40 CFR 60, Subpart JJJJ**

The Emergency Generator shall meet all applicable requirements under 40 CFR 60, Subpart JJJJ including the following:

- (1) Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE.

[40 CFR §60.4233(e)]

e. **45CSR2**

The boiler is subject to the applicable limitations and standards under 45CSR2, including the requirements as given below under (1) through (3).

(1) The permittee shall not cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from the fuel burning units which is greater than ten (10) percent opacity based on a six minute block average.

[45CSR§2-3.1]

(2) The permittee shall not cause, suffer, allow or permit the discharge of particulate matter into the open air from the fuel burning units, measured in terms of pounds per hour in excess of the amount determined as follows:

(i) The product of 0.09 and the total design heat input for the fuel burning units in million British Thermal Units (B.T.U.'s) per hour, provided however that no more than twelve hundred (1200) pounds per hour of particulate matter shall be discharged into the open air.

[45CSR§2-4.1a]

(3) The visible emission standards set forth in section 3 of 45CSR2 shall apply at all times except in periods of start-ups, shutdowns and malfunctions. Where the Director believes that start-ups and shutdowns are excessive in duration and/or frequency, the Director may require an owner or operator to provide a written report demonstrating that such frequent start-ups and shutdowns are necessary.

[45CSR§2-9.1]

f. **45CSR10**

The boiler is subject to the applicable limitations and standards under 45CSR10, including the requirement as given below under (1).

(1) The permittee shall not cause, suffer, allow or permit the discharge of sulfur dioxide into the open air from the fuel burning units measured in terms of pounds per hour, in excess of the product of 3.2 and the total design heat of the boilers in million BTU's per hour.

[45CSR§10-3.1]

4.1.5. **Storage Tanks**

Use of the storage tanks, identified as T0-1 through T0-3, shall be in accordance with the following:

a. Tank size and material stored shall be limited as specified under Table 1.0 of this permit; and

b. The throughput of pipeline liquids shall not exceed a limit of 12,500 gallons per year.

4.1.6. **Truck Loadout**

The Truck Loading operations, identified as LR-1, shall be in accordance with the following requirements:

a. All trucks shall be loaded using the submerged-fill method. The "submerged-fill method" shall, for the purposes of this permit, mean either bottom-filling or filling by extending the pipe to near the bottom of the tank, and as soon as is practicable, below the level of liquid; and

b. The maximum loadout of produced liquids from the storage tanks shall not exceed 12,500 gallons per year.

4.1.7. **Control Devices**

Use of oxidation catalysts shall be in accordance with the following:

- a. The SCR systems and oxidation catalysts shall be designed, operated and maintained according to good engineering practices and manufacturing recommendations so as to achieve, at a minimum, the following emissions control effectiveness:
 - (1) NO_x: 44.4%;
 - (2) CO: 80%; and
 - (3) VOCs: 50%.
- b. Catalyst performance shall be monitored and catalysts replaced according to good engineering practices and manufacturing recommendations; and
- c. The permittee shall operate the SCR in the optimal aqueous ammonia injection range as determined according to manufacturer recommendations or during the required performance testing. Ammonia slip from each SCR shall not exceed 10 ppmvd at 15% O₂ except during periods of “low-load mode” as defined under 4.2.3(1) and (2).
- d. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.1.8. **Fugitive Emissions**

The permittee shall mitigate the release of fugitive emissions according to the following requirements:

- a. The permittee shall, within 180 days of facility startup, submit a modification or Class II Administrative Update, as applicable pursuant 45CSR13, to revise the number and type of components (valves, pump seals, connectors, etc.) in gas/vapor or light liquid (as applicable) listed in Attachment N of Permit Application R13-3271 or any amendments or revisions submitted thereto if the as-built number of components results in calculated VOC or HAP emissions in excess of those given under Attachment N;
- b. The permittee shall install, maintain, and operate all above-ground piping, valves, pumps, etc. that service lines in the transport of potential sources of regulated air pollutants to prevent any substantive fugitive escape of regulated air pollutants. Any above-ground piping, valves, pumps, etc. that shows signs of excess wear and that have a reasonable potential for substantive fugitive emissions of regulated air pollutants shall be replaced;
- c. The number of compressor blowdowns events due to both turbine startups and shutdowns shall each not exceed 100 per year. However, in lieu of the event limits given in this section, if the permittee can accurately determine the quantity of gas released during each event, the permittee may show compliance with 4.1.12(c) by limiting total annual gas released to less than 10.1 mmscf; and
- d. The permittee shall develop a plan to limit the duration of any unforeseen release of natural gas by responding to the event in a reasonable time frame. This plan will include the placement of

visible contact information at the facility for public reporting such an event. This plan shall be submitted to the DAQ prior to startup of the facility.

- 4.1.9. The permittee shall meet all applicable requirements, including those not specified above, as given under 45CSR2, 45CSR10, 40 CFR 60, Subparts Dc, JJJJ, and KKKK and 40 CFR 63, Subpart ZZZZ. Any final revisions made to the above rules will, where applicable, supercede those specifically cited in this permit.

4.2. Monitoring, Compliance Demonstration, Recording and Reporting Requirements

4.2.1. Combustion Turbines

The CTs shall meet the following Monitoring, Compliance Demonstration, Recording and Reporting Requirements:

- a. The permittee shall monitor and record the monthly amount of hours each CT operates in the following modes:
- (1) Normal Mode = Load \geq 50%: SoLoNO_x mode, SCR and Ox-Cat operating at minimum required efficiencies;
 - (2) Low-Temperature Mode = Temperature \leq 0°F: non-SoLoNO_x mode, SCR and Ox-Cat operating at minimum required efficiencies;
 - (3) Low-Load (Startup) Mode = Load < 50%: non-SoLoNO_x mode, SCR and Ox-Cat not operating at minimum required efficiencies; and
 - (4) Low-Load (Shutdown) Mode = Load < 50%: non-SoLoNO_x mode, SCR and Ox-Cat not operating at minimum required efficiencies.
- b. To determine compliance with the CT annual emissions limits given in Appendix A, the permittee shall calculate the monthly and twelve month rolling average of actual emissions (in tons) that each CT emitted. The calculation of actual monthly and annual emissions shall be in accordance with the following:
- (1) The permittee shall, by the 15th of each calendar month, calculate the actual monthly and rolling twelve month total of emissions of each CT using the data recorded under 4.2.1(a) and the best available emission factors in accordance with the following requirements:
 - (i) Emission factors may be used that were measured during the most recent performance test approved the Secretary (and that were used to determine compliance with hourly limits given in Appendix A);
 - (ii) When emission factors as described under 4.2.1(b)(i) are not available, the permittee shall use the emission factors used to calculate the potential-to-emit of the CTs as given in Permit Application R13-3271.
- c. **40 CFR 60, Subpart KKKK**
You may elect not to monitor the total sulfur content of the fuel combusted in the turbine, if the fuel is demonstrated not to exceed potential sulfur emissions of 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for units located in continental areas and 180 ng SO₂/J (0.42 lb SO₂/MMBtu) heat input for units located in noncontinental areas or a continental area that the

Administrator determines does not have access to natural gas and that the removal of sulfur compounds would cause more environmental harm than benefit. You must use one of the following sources of information to make the required demonstration:

- (1) The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for oil use in continental areas is 0.05 weight percent (500 ppmw) or less and 0.4 weight percent (4,000 ppmw) or less for noncontinental areas, the total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet and 140 grains of sulfur or less per 100 standard cubic feet for noncontinental areas, has potential sulfur emissions of less than less than 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for continental areas and has potential sulfur emissions of less than less than 180 ng SO₂/J (0.42 lb SO₂/MMBtu) heat input for noncontinental areas; or
- (2) Representative fuel sampling data which show that the sulfur content of the fuel does not exceed 26 ng SO₂/J (0.060 lb SO₂/MMBtu) heat input for continental areas or 180 ng SO₂/J (0.42 lb SO₂/MMBtu) heat input for noncontinental areas. At a minimum, the amount of fuel sampling data specified in section 2.3.1.4 or 2.3.2.4 of appendix D to part 75 of this chapter is required.
[40 CFR§60.4365]

4.2.2. **Emergency Generator**

For the purposes of demonstrating compliance with the maximum hours of operation limits set forth in 4.1.3(a), the permittee shall maintain monthly and rolling twelve month records of the hours of operation of the emergency generator.

4.2.3. **Boiler**

Upon request by the Secretary, compliance with the visible emission requirements of 4.1.4(e)(3) shall be determined in accordance with 40 CFR Part 60, Appendix A, Method 9 or by using measurements from continuous opacity monitoring systems approved by the Secretary. The Secretary may require the installation, calibration, maintenance and operation of continuous opacity monitoring systems and may establish policies for the evaluation of continuous opacity monitoring results and the determination of compliance with the visible emission requirements of 4.1.4(e)(3). Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control.

[40CSR§2-3.2]

4.2.4. **Storage Tanks**

For the purposes of demonstrating compliance with maximum throughput limit of pipeline liquids set forth in 4.1.5(b), the permittee shall monitor and record the monthly and rolling twelve month total of pipeline liquids (in gallons) throughput in the storage tank. Monitoring and recording the monthly and rolling twelve month total of pipeline liquids (in gallons) unloaded from the storage tank can be used to show compliance with this requirement.

4.2.5. **Control Devices**

The permittee shall meet the following Monitoring, Compliance Demonstration, Recording and Reporting Requirements for the oxidation catalysts:

- a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of each combustion turbine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution

control devices by following the catalyst manufacturer emissions related operating and maintenance recommendations, or develop, implement, or follow a site-specific maintenance plan.

- b. To demonstrate compliance with section 4.2.5(b), the permittee shall maintain a copy of the site specific maintenance plan or manufacturer maintenance plan.

4.2.9 Fugitive Emissions

The permittee shall meet the following Monitoring, Compliance Demonstration, Recording and Reporting Requirements for the fugitive emissions:

- a. For the purposes of determining compliance with 4.1.8(c), the permittee shall monitor and record the monthly and rolling twelve month records of the number of compressor blowdowns events due to both turbine startups and shutdowns at the facility. The information will further include the duration, estimated volume of gas vented, and reason for event; and
- b. The permittee shall monitor and record other events (not listed under 4.1.8(c)) where a significant amount of gas is released (i.e., pressure relief trips). The information will further include the duration, estimated volume of gas vented, reason for event, and corrective actions taken.
- c. The permittee shall report all events recorded under 4.2.9(b) to the DAQ in writing as soon as practicable but no later than fifteen (15) days after the event.

4.3. Performance Testing Requirements

- 4.3.1. At such reasonable time(s) as the Secretary may designate, in accordance with the provisions of 3.3 of this permit, the permittee shall conduct or have conducted test(s) to determine compliance with the emission limitations established in this permit and/or applicable regulations.

4.3.2. Combustion Turbines

The permittee shall meet the following performance testing requirements with respect to the CTs:

- a. The permittee shall, pursuant to the timing and other requirements of 40 CFR 60, Subpart KKKK, conduct, or have conducted, performance testing on the CTs to determine the emission rates of NO_x and SO₂ during operation in “normal mode” as defined 4.2.1(a)(1). The testing shall, in addition to meeting all applicable requirements under 40 CFR 60, Subpart KKKK, be in accordance with 3.3.1. Results of the this performance testing shall, unless granted in writing a waiver by the Director, be used to determine compliance with the NO_x and SO₂ emission limits given under 4.1.2(e);
- b. In addition to the required performance testing under 4.3.2(a), the permittee shall, within 60 days after achieving the maximum rate at which the CTs will be operated, but not later than 180 days after initial startup, the permittee shall conduct, or have conducted, a performance test on the each CT to determine compliance with the emission limits of CO, particulate matter, and VOCs during operation in “normal mode” as defined 4.2.1(a)(1). After the initial tests, subsequent performance testing shall be conducted annually (no more than 14 months following the previous test) unless the previous results demonstrate that the affected units achieved compliance of less than or equal to 75 percent of the applicable emission limits, then the permittee may reduce the frequency of subsequent tests to once every three years (no more than 38 calendar months following the previous test). The permittee shall use the test methods specified in Table 4.3.2(b) unless granted approval in writing by the Director to use an alternative test method in a protocol submitted pursuant to 3.3.1.c.

Table 4.3.2(b): Combustion Turbine Test Methods

Pollutant	Test Method⁽¹⁾
CO	Method 10B
PM (filterable)	Method 5
PM ₁₀ /PM _{2.5} (filterable)	Method 201A
PM ₁₀ /PM _{2.5}	Method 202
VOCs	Method 18

(1) All test methods refer to those given under 40 CFR 60, Appendix A

4.4. Additional Recordkeeping Requirements

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

- a. The date, place as defined in this permit and time of sampling or measurements;
- b. The date(s) analyses were performed;
- c. The company or entity that performed the analyses;
- d. The analytical techniques or methods used;
- e. The results of the analyses; and
- f. The operating conditions existing at the time of sampling or measurement.

4.4.2. **Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment listed in Section 1.0, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.

4.4.3. **Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:

- a. The equipment involved.
- b. Steps taken to minimize emissions during the event.
- c. The duration of the event.
- d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

- e. The cause of the malfunction.

- f. Steps taken to correct the malfunction.
- g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

CERTIFICATION OF DATA ACCURACY

I, the undersigned, hereby certify that, based on information and belief formed after reasonable inquiry, all information contained in the attached _____, representing the period beginning _____ and ending _____, and any supporting documents appended hereto, is true, accurate, and complete.

Signature¹ _____
(please use blue ink) Responsible Official or Authorized Representative Date

Name and Title _____
(please print or type) Name Title

Telephone No. _____ Fax No. _____

¹ This form shall be signed by a "Responsible Official." "Responsible Official" means one of the following:

- a. For a corporation: The president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either:
 - (I) the facilities employ more than 250 persons or have a gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), or
 - (ii) the delegation of authority to such representative is approved in advance by the Director;
- b. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;
- c. For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of USEPA); or
- d. The designated representative delegated with such authority and approved in advance by the Director.

Appendix A

Atlantic Coast Pipeline, LLC
 R13-2371-041-00076
 Marts Compressor Station

Table A1: Combustion Turbine Emission Limits⁽¹⁾⁽²⁾

Turbine ID Number	Turbine Model	Operational Mode	CO		NO _x		PM _{2.5} /PM ₁₀ /PM ₁₀		SO ₂		VOC		Formaldehyde		Total HAPs	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
CT-4	Taurus 60	Normal	0.80	8.45	1.33	6.28	1.50	6.57	0.24	1.06	0.12	0.56	0.10	0.50	0.11	0.53
		Low-Temp	4.80		17.80											
		Low-Load (Startup)	385.50		4.20											
		Low-Load (Shutdown)	198.00		2.40											
CT-3	Taurus 70	Normal	1.06	13.08	1.78	8.40	1.90	8.32	0.32	1.41	0.16	0.78	0.14	0.68	0.14	0.72
		Low-Temp	6.36		23.60											
		Low-Load (Startup)	438.60		4.80											
		Low-Load (Shutdown)	560.40		6.60											
CT-2	Mars 100	Normal	1.58	20.73	2.61	12.35	2.90	12.70	0.48	2.08	0.23	1.14	0.20	1.02	0.21	1.09
		Low-Temp	9.48		34.70											
		Low-Load (Startup)	741.00		8.40											
		Low-Load (Shutdown)	895.20		10.20											
CT-1	Titan 130	Normal	1.92	27.87	3.17	15.01	3.50	15.33	0.58	2.53	0.28	1.43	0.24	1.27	0.26	1.35
		Low-Temp	11.52		42.20											
		Low-Load (Startup)	1062.00		11.40											
		Low-Load (Shutdown)	1248.00		14.40											

(1) Annual emissions represent aggregate 12-month rolling average contributions from all operational scenarios.
 (2) Hourly emissions of particulate matter and SO₂ are expected to be constant over all operational scenarios.



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. Huffinan, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3271
Plant ID No.: 041-00076
Applicant: Atlantic Coast Pipeline, LLC
Facility Name: Marts Compressor Station
Location: Near Jane Lew, Lewis County
SIC/NAICS Code: 4922/486210
Application Type: Construction
Received Date: September 17, 2015
Engineer Assigned: Joe Kessler
Fee Amount: \$4,500
Date Received: October 28, 2015
Complete Date: February 25, 2016
Due Date: May 25, 2016
Applicant's Ad Date: September 26, 2015
Newspaper: *The Exponent Telegram*
UTM's: 545.53 km Easting • 4,332.66 km Northing • Zone 17
Latitude/Longitude: 39.13944/-80.46556
Description: Construction of a natural gas compressor station.

Entire Document
NON-CONFIDENTIAL

DESCRIPTION OF PROCESS

Atlantic Coast Pipeline, LLC (ACP) is proposing to construct a natural gas compressor station to be located approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road). The proposed Marts Compressor Station will consist of four (4) Solar Combustion Turbines (20,500 brake-horsepower (bhp), 15,900 bhp, 10,915 bhp, and 7,700 bhp), one (1) 2,098 hp 4-Stroke Lean Burn (4SLB) natural gas-fired Caterpillar G3516C Emergency Generator (1,500 kW_e), one (1) 10.7 mmBtu/hr natural gas-fired boiler, and three (3) ancillary liquid storage tanks.

ACP (a company jointly owned by Dominion Resources, Duke Energy, Piedmont Natural Gas, and AGL Resources) has proposed the construction of a large compressor station to be used to transport natural gas along a proposed 556-mile long interstate pipeline system designed to move the gas from West Virginia to North Carolina and Virginia. To provide pressure for this station, ACP is proposing to install and operate the following natural gas-fired combustion turbines:

- A 20,500 bhp (170.0 mmBtu/hr) Solar Titan 130-20502S Combustion Turbine (CT-1);
- A 15,900 bhp (140.0 mmBtu/hr) Solar Mars 100-16000S Combustion Turbine (CT-2);
- A 10,915 bhp (94.5 mmBtu/hr) Solar Taurus 70-10802S Combustion Turbine (CT-3); and
- A 7,700 bhp (71.4 mmBtu/hr) Solar Taurus 60-7800S Combustion Turbine (CT-4).

Combustion turbines work by converting the energy in the fuel gas to mechanical energy that then powers the pipeline gas compressors. The compressors increase the pressure of the pipeline gas to provide it motive power to move from one location to another. To generate the maximum amount of mechanical energy from the fuel gas, combustion turbines operate similarly to a jet engine. Fresh atmospheric air flows through an air compressor that brings it to higher pressure. Energy is then added by spraying fuel into the compressed air and igniting it so the combustion generates a high-temperature flow. This high-temperature, high-pressure gas enters a turbine, where it expands down to the exhaust pressure, turning a shaft that powers both the turbine's air compressor and other large compressors that pressure the pipeline gas. The energy that is not used for shaft work comes out in the exhaust gases (which include primarily the pollutants NO_x, CO, and VOCs).

The proposed turbines will be equipped with Solar's SoLoNO_x dry low-NO_x combustor technology and add-on emission controls: selective catalytic reduction (SCR) for NO_x control (SCR-01 through SCR-04) and use of an oxidation catalyst for CO, VOC, formaldehyde, and total Hazardous Air Pollutants (HAPs) control (OxCat-01 through OxCat-04). An SCR selectively reduces NO_x emissions by injecting ammonium (NH₃) into the exhaust gas stream upstream of a catalyst. The compounds NO_x, NH₃, and O₂ react on the surface of the catalyst to form N₂ and H₂O. Carbon monoxide oxidation catalysts are typically used on turbines to achieve control of CO and hydrocarbon emissions. The catalyst is usually made of a precious metal such as platinum, palladium, or rhodium. Other formulations, such as metal oxides for emission streams containing chlorinated compounds, are also used. The CO catalyst promotes the oxidation of CO and hydrocarbon compounds to carbon dioxide (CO₂) and water (H₂O) as the emission stream passes through the catalyst bed.

Additionally, the proposed facility will utilize a 10.7 mmBtu/hr natural gas-fired boiler (utilizing low-NO_x boilers) to provide process heat and a 2,098 hp 4SLB natural gas-fired Caterpillar G3516C Emergency Generator to provide backup power. Several liquid storage tanks (through TK-3) will be used at the proposed station to store pipeline liquids (TK-1: 2,500 gallons), waste oil (TK-2: 2,500 gallons), and ammonia (TK-3: 8,000 gallons).

SITE INSPECTION

On November 18, 2015, the writer conducted an inspection of the proposed location of the Marts Compressor Station. The proposed Marts site is located in a rural area of Lewis County approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road). The writer was accompanied on the inspection by Mr. Jay Riley, the (future) plant manager of the proposed station. Observations from the inspection include:

- The proposed facility will lie atop a hill approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road). The area is mountainous and rural in nature with scattered homes and farms within several miles of the proposed location. Much natural gas construction activity (pipelines, well-heads, etc.) is located in the County;
- At the time of the inspection, there was no activity at the site; and
- The occupied dwelling located nearest to the proposed site is approximately 0.17 miles south of the proposed site at the bottom of the hill along Hollick Run Road. A currently (at the time of the inspection) occupied home near the beginning of the access road has been purchased and will be demolished.

The following is a picture of the proposed site of the Marts Compressor Station:



Directions: [Latitude: 39.13944, Longitude: -80.46556] From the I-79 Jane Lew exit proceed west on Hacker's Creek Road (SR 7) and then turn right on US 19 North (Main Street). From US 19 North, quickly turn left on Broad Run Road (SR 8). Stay on Broad Run Road until turning right onto Old Mill Road (SR 1). From Old Mill Road, turn left onto Hollick Run Road. Proceed on Hollick Run Road for approximately 0.3 miles and the facility access road will be on the right.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

ACP included in Attachment N of the permit application air emissions calculations for the proposed Marts Compressor Station. The following will summarize the calculation methodologies used by ACP to calculate the potential-to-emit (PTE) of the proposed facility.

Combustion Turbines

Potential emissions from the Solar Combustion Turbines (CTs) are generated from three different operating scenarios: steady-state, steady-state at low temperatures ($0^{\circ}\text{F} < t < -20^{\circ}\text{F}$), and startup/shutdown emissions (when the SoLoNO_x system is not operating). The emissions from the combustion turbines are given in tabular form in Attachment A to this evaluation.

Steady-State (Normal Operation) Emissions

Uncontrolled emissions from the CTs during normal operation are based on unit-specific information provided by the turbine vendor (NO_x, CO, VOCs, formaldehyde, total HAPs, and particulate matter) and on emission factors (SO₂) taken from AP-42, Section 3.1 (AP-42 is a database of emission factors maintained by USEPA). Maximum hourly emissions are based on the highest given emission rate at normal conditions (temperatures above 0°F) and at full load. Annual emissions are based on the CTs operating 8,677 hours/year (the remaining hours emissions are based on other operating scenarios) for (NO_x, CO, VOCs, formaldehyde, and total HAPs and 8,760 hours for SO₂ and PM, respectively. All steady-state (normal operation) uncontrolled emissions are based on the turbines using the SoLoNO_x combustion system. VOC emissions are based on 10% on the unburnt hydrocarbons (UHC) in the fuel gas being classified as VOCs.

Controlled emissions from the CTs during normal operation are based on use of the SCR (NO_x) and oxidation catalysts (CO and VOCs) to control emissions of NO_x, CO, and hydrocarbons at a vendor guaranteed rates of 44%, 80%, and 50%, respectively.

Low-Temperature Emissions

During periods of CT operation at low-temperatures (temperatures below 0°F), the SoLoNO_x system either does not operate or does not operate as effectively. Therefore, potential uncontrolled emissions (of NO_x, CO, VOCs, formaldehyde and total HAPs) from operation during these periods are higher than in periods of normal operation. Maximum uncontrolled hourly emissions of these pollutants during these operational periods are based on information provided by the vendor. The annual emissions from this operational scenario is based on 50 hours/year (which is based on, according to ACP, historic meteorological data). Controlled emission rates are again based on the use of the SCR (NO_x) and oxidation catalysts (CO and VOCs) to control emissions of NO_x, CO, and hydrocarbons at a vendor guaranteed rates of 44%, 80%, and 50%, respectively.

Startup/Shutdown Emissions

During periods of CT operation at low-loads (less than 50%), while some effectiveness of all the control options are expected, to be conservative, ACP estimated that the emissions from the turbines are each uncontrolled. The only scenario identified by ACP where the turbines would operate at low-loads was during startup/shutdown. Therefore, potential emissions during these scenarios were based on uncontrolled emissions (of NO_x, CO, VOCs, formaldehyde and total HAPs) that are also higher during these periods than in periods of normal operation. Maximum uncontrolled hourly emissions of these pollutants during these operational periods are based on information provided by the vendor. The annual emissions from this operational scenario is based on 100 startup and 100 shutdown events per year with each event lasting an average of 10 minutes. This gives an annual hours of operation in these modes of 33.33 hours/year. As it is conservatively estimated that the control devices are not effective during these modes, no control percentages were applied to the uncontrolled emissions.

Hazardous Air Pollutants

As stated above, ACP used vendor emission factors to calculate the PTE of formaldehyde and total HAPs from the CTs. AP-42 Section 3.2, however, provides emission factors for other HAPs emitted from combustion turbines. The following table details the annual HAP emissions (based on 8,760 hours of operation/year and a control percentage of 50%) from the turbines using these emission factors:

Table 1: AP-42 Section 3.2 HAP CT Emission Calculations (lbs/year)⁽¹⁾

Pollutant	Emission Factor (lb/mmBtu)	CT-1	CT-2	CT-3	CT-4	Total
		MDHI (mmBtu/hr)				
		170.00	140.00	94.50	71.40	
1,3-Butadiene	4.30e-07	0.32	0.26	0.18	0.13	0.90
Acetaldehyde	4.00e-05	29.78	24.53	16.56	12.51	83.38
Acrolein	6.40e-06	4.77	3.92	2.65	2.00	13.34
Benzene	1.20e-05	8.94	7.36	4.97	3.75	25.01
Ethylbenzene	3.20e-05	23.83	19.62	13.25	10.01	66.70
Naphthalene	1.30e-06	0.97	0.80	0.54	0.41	2.71
PAH	2.20e-06	1.64	1.35	0.91	0.69	4.59
Propylene Oxide	2.90e-05	21.59	17.78	12.00	9.07	60.45
Toluene	1.30e-04	96.80	79.72	53.81	40.66	270.98
Xylenes	6.40e-05	47.65	39.24	26.49	20.01	133.40

(1) Low-load and low-temperature scenario not considered in these calculations. Formaldehyde not included as vendor emission factor supplied.

Boiler Emissions

Combustion emissions from the 10.7 mmBtu/hr natural gas-fired boiler (WH-1) were based on the emission factors provided for natural gas combustion as given in AP-42 Section 1.4 (when using a low-NO_x combustor). Hourly emissions were based on the MDHI of the unit and annual emissions were based on an annual operation of 8,760 hours. A fuel/waste gas heat content value of 1,020 Btu/ft³ was used in the calculations.

Emergency Generator

Potential emissions from the Caterpillar G3516C 4SLB 2,098 hp compressor engine (EG-1) were based on emission factors provided by the oxidation catalyst vendor, the engine vendor, and as given in AP-42, Section 3.2. Hourly emissions were based on the (as calculated using a fuel heat rating of 6,935 Btu/hp-hr) maximum design heat input (MDHI) of the engines of 14.55 mmBtu/hr and the maximum hp rating. Annual emissions were based on 100 hours of operation per year. The following table details the PTE of the compressor engine:

Table 2: Emergency Generator PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO	1.95 g/hp-hr	Engine Vendor	9.02	0.45
NO _x	0.50 g/hp-hr	Engine Vendor	2.31	0.12
PM _{2.5} /PM ₁₀ /PM ⁽¹⁾	9.91 x 10 ⁻³ lb/mmBtu	AP-42, Table 3.2-2	0.14	0.007
SO ₂	5.88 x 10 ⁻⁴ lb/mmBtu	AP-42, Table 3.2-2	0.01	0.0004
VOCs	1.05 g/hp-hr	Engine Vendor	4.86	0.24
Total HAPs	Various	AP-42, Table 3.2-2	0.43	0.02
Formaldehyde	0.52 g/hp-hr	Engine Vendor	2.41	0.12

(1) Includes condensables.

Storage Tanks

ACP provided an estimate of the uncontrolled VOC emissions produced from the 2,500 gallon pipeline liquids and lube oil storage tanks (TK-1 and TK-2) using the TANKS 4.09d program (working/breathing losses) as provided under AP-42, Section 7. These were the only storage tanks on site determined to have the potential for any substantive emissions. The total emissions from each fixed roof storage tank are the combination of the calculated “breathing loss” and “working loss.” The breathing loss refers to the loss of vapors as a result of tank vapor space breathing (resulting from temperature and pressure differences) that occurs continuously when the tank is storing liquid. The working loss refers to the loss of vapors as a result of tank filling or emptying operations. Standing losses are independent of storage tank throughput while working losses are dependent on throughput.

Hourly emissions (not calculated by TANKS) were based on the calculated annual losses as divided by 8,760 hours/yr. Annual emissions were as calculated by the TANKS program and based on specific throughputs of each tank (12,500 gallons of pipeline liquids and 10,000 gallons of lube oil). Based on the low-VOC and low-vapor pressure material stored, potential emissions from the storage tanks were very small: total emissions from the tanks were 0.08 lbs/hr and 0.35 tons/year.

Truck Loadouts

VOC emissions from pipeline liquid loading operations (LR-1) occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-4. In this equation, ACP used variables specific to the liquids loaded and to the method of loading - in this case "submerged loading: dedicated normal service." Additionally, worst-case annual emissions were based on a maximum loading rate of 12,500 gal/year of pipeline liquids. Maximum hourly emissions were based on a maximum loading rate of 90 gallons/minute. A conservative value of 20% was used to calculate the VOC percentage of the fluids.

Fugitives

Equipment Leaks

ACP based their VOC fugitive equipment leak calculations on emission factors taken from the document EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates" Table 2-4. No control efficiencies, as based on a Leak Detection and Repair (LDAR) protocol, were applied. Component counts were given and shall be limited in the draft permit. VOC/HAP by-weight percentages (2.6% and 0.15%, respectively) of the natural gas was also used in the calculations.

Maintenance and Emergency Events

ACP also included in their fugitive emission estimate release of natural gas during compressor blowdown during startup/shutdown events (100 events/year/turbine). Emissions were calculated based on a gas loss of 38,000 scf/startup and 63,000 scf/shutdown (as based on conservative engineering estimates pursuant to data from an other similar station). VOC/HAP by-weight percentages (2.6% and 0.15%, respectively) of the natural gas was also used in the calculations.

Emissions Summary

Based on the above estimation methodology as submitted in Attachment N of the permit application, the post-modification facility-wide PTE of the proposed Marts Compressor Station is given in Attachment B.

REGULATORY APPLICABILITY

The proposed Marts Compressor Station is subject to the following substantive state and federal air quality rules and regulations: 45CSR2, 45CSR10, 45CSR13, 40 CFR 60 Subparts DC,

Fact Sheet R13-3271
Atlantic Coast Pipeline, LLC
Marts Compressor Station

JJJJ and KKKK, and 40 CFR 63 Subpart ZZZZ. Each applicable rule (and those that have questionable non-applicability) and ACP's compliance therewith will be discussed in detail below.

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

Pursuant to the definition of “fuel burning unit” under 45CSR2 (“producing heat or power by indirect heat transfer”), 45CSR2 does not apply to the combustion turbines. However, the 10.7 mmBtu/hr natural gas-fired boiler has been determined to meet the definition of a “fuel burning unit” under 45CSR2 and is, therefore, subject to the applicable requirements therein. Each substantive 45CSR2 requirement is discussed below.

45CSR2 Opacity Standard - Section 3.1

Pursuant to 45CSR2, Section 3.1, the boiler is subject to an opacity limit of 10%. Proper maintenance and operation of the boiler (and the use of natural gas as fuel) should keep the opacity of the unit well below 10% during normal operations.

45CSR2 Weight Emission Standard - Section 4.1.b

The allowable particulate matter (non-condensable total particulate matter) emission rate for the boiler, identified as a Type “b” fuel burning unit, per 45CSR2, Section 4.1.a, is the product of 0.09 and the total design heat input of the boiler in million Btu per hour. The maximum aggregate design heat input (short-term) of the boiler will be 10.7 mmBtu/hr. Using the above equation, the 45CSR2 particulate matter emission limit of the boiler will be 0.96 lb/hr. The maximum potential hourly PM emissions (including condensables) from the boiler is estimated to be 0.08 lb/hr. This emission rate is 8.31% of the 45CSR2 limit.

45CSR2 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of Rule 2 requires testing for initial compliance with the limits therein, monitoring for continued compliance, and keeping records of that compliance. The TMR&R requirements are clarified under 45CSR2A and discussed below.

45CSR2A Applicability - Section 3

Pursuant to §45-2A-3, as an individual applicable “fuel burning unit” under 45CSR2 with an MDHI less than 100 mmBtu/hr, the boiler is not subject to the Testing and MRR Requirements under 45CSR2A.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides (NON APPLICABILITY)

45CSR10 has requirements limiting SO₂ emissions from “fuel burning units,” limiting in-stack SO₂ concentrations of “manufacturing processes,” and limiting H₂S concentrations in process

gas streams. Pursuant to the definition of “fuel burning unit” under 45CSR10 (“producing heat or power by indirect heat transfer”), the limitations on fuel burning units under 45CSR10 do not apply to the combustion turbines. The proposed ACP boiler is defined as a “fuel burning unit” and subject to the applicable requirements discussed below.

45CSR10 Fuel Burning Units - Section 3

The allowable SO₂ emission rate for the boiler (located in Region III), identified as a Type “b” fuel burning unit, per 45CSR10, Section 3.3(f), is the product of 3.2 and the total design heat input of the boiler in million Btu per hour. The maximum aggregate design heat input (short-term) of the boiler will be 10.7 mmBtu/hr. Using the above equation, the 45CSR10 SO₂ emission limit of the boiler will be 34.24 lb/hr. The maximum potential hourly SO₂ emissions from the boiler is estimated to be 0.01 lb/hr. This emission rate is only a trace of the 45CSR10 limit.

45CSR10 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of Rule 10 requires to test for initial compliance with the limits therein, monitor for continued compliance, and keep records of that compliance. The TMR&R requirements are clarified under 45CSR10A and discussed below.

45CSR10A Applicability - Section 3

Pursuant to §45-10A-3.1(b), as the boiler combusts “natural gas, wood or distillate oil, alone or in combination,” the boiler is not subject to the Testing and MRR Requirements under 45CSR10A.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed construction of the Marts Compressor Station has a potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY (see Attachment B) and, therefore, pursuant to §45-13-2.24, the proposed facility is defined as a “stationary source” under 45CSR13. Pursuant to §45-13-5.1, “[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct.” Therefore, ACP is required to obtain a permit under 45CSR13 for the construction and operation of the proposed facility.

As required under §45-13-8.3 (“Notice Level A”), ACP placed a Class I legal advertisement in a “newspaper of *general circulation* in the area where the source is . . . located.” The ad ran on September 26, 2015 in *The Exponent Telegram* and the affidavit of publication for this legal advertisement was submitted on October 20, 2015.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Marts Compressor Station is proposed to be located in Lewis County, WV. Lewis County is classified as "in attainment" with all National Ambient Air Quality Standards. Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY. As given in Attachment B, the facility-wide PTE of the proposed Marts Compressor Station is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under either 45CSR14 and the rule does not apply.

45CSR27: To Prevent and Control the Emissions of Toxic Air Pollutants - (NON APPLICABILITY)

Pursuant to §45-27-3.1, the "owner or operator of a plant that discharges or may discharge a toxic air pollutant into the open air in excess of the amount shown in the Table A [of 45CSR27] shall employ [Best Available Technology] at all chemical processing units emitting the toxic air pollutant." As shown in Attachment B, the aggregate PTE of formaldehyde at the facility is greater than 0.5 TPY - greater than the 1,000 pound per year threshold given in Table A of 45CSR27. However, the combustion turbines and emergency generator do not meet the definition of "chemical processing units" under §45-27-2.4 and, therefore, they are not subject to BAT under 45CSR27.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The proposed Marts Compressor Station does not meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The proposed facility-wide PTE (see Attachment B) of any regulated pollutant does not exceed 100 TPY. Additionally, the facility-wide PTE does not exceed 10 TPY of any individual HAP or 25 TPY of aggregate HAPs.

However, as the facility is subject to a New Source Performance Standard (NSPS) - 40 CFR 60, Subpart Dc that does not contain a Title V permitting exemption, the proposed facility is subject to Title V as a non-major source. Non-major sources subject to Title V, pursuant to DAQ policy, are deferred from having to submit a Title V application.

40 CFR 60, Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

40 CFR 60 Subpart Dc is the New Source Performance Standard (NSPS) for industrial-commercial-institutional steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design heat input capacity between 10 and 100 mmBtu/hr. The proposed boiler is subject to 40 CFR 60, Subpart Dc under the above applicability requirements of §60.40c(a). Subpart Dc does not have any emission standards

for boilers that combust only natural gas. Boilers are, however, subject to the record-keeping and reporting requirements given under §60.48c.

40 CFR 60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (NON APPLICABILITY)

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to “each storage vessel with a capacity greater than or equal to 75 cubic meters (m³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.” The largest storage tank proposed for the Marts Compressor Station that will store VOLs is 2,500 gallons, or 9.5 m³. Therefore, Subpart Kb does not apply to any storage tanks at the proposed facility.

40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

ACP’s proposed Caterpillar G3516C 4SLB 2,098 hp emergency generator proposed for the Marts Compressor Station is defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and is, pursuant to §60.4230(a)(4)(iv), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): “Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE.” Therefore, as the proposed ACP’s emergency generator is greater than 100 hp, the engine must comply with the emission standards under Table 1 for “Emergency ≥ 130 hp:” NO_x - 2.0 g/HP-hr, CO - 4.0 g/HP-hr, and VOC - 1.0 g/HP-hr. The emission standards and the proposed compliance therewith of the engines are given in the following table:

Table 3: Caterpillar G3516C Subpart JJJJ Compliance

Pollutant	Standard (g/HP-hr)	Uncontrolled Emissions (g/bhp) ⁽¹⁾	Control Percentage	Controlled Emissions (g/bhp) ⁽¹⁾	JJJJ Compliant?
NO _x	2.0	0.50	0.00%	0.50	Yes
CO	4.0	1.95	0.00%	1.95	Yes
VOC	1.0	0.53	0.00%	0.53	Yes

(1) Pursuant to Subpart JJJJ, VOC emissions do not include CH₂O emissions. Uncontrolled emissions represent the highest emission rate given on vendor data sheet at various loads.

Use of an emergency engine further requires compliance with the operating requirements given under §60.4243(d).

40 CFR 60 Subpart KKKK: Standards of Performance for Stationary Combustion Turbines

40 CFR 60 Subpart KKKK is the NSPS for stationary combustion turbines of greater than 10 mmBtu/hr and which commenced construction, modification, or reconstruction after February 18, 2005. Subpart KKKK contains within it emission standards for NO_x and SO₂, compliance

methods, monitoring requirements, and reporting and record-keeping procedures for affected facilities applicable to the rule. The following discusses the applicable substantive requirements of Subpart KKKK relating to the proposed combustion turbines.

Pursuant to §60.4305(a), Subpart KKKK applies to stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 mmBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005. Therefore, each of the proposed combustion turbines are subject to 40 CFR 60, Subpart KKKK.

Section §60.4320 requires affected facilities to meet NO_x emission standards given under Table 1 of the Subpart. As each unit is a turbine firing natural gas between 50 and 850 mmBtu/hr, pursuant to Table 1, each unit has to meet a NO_x limit of 25 ppm at 15% O₂ or 1.2 lb/MW-hr gross energy output. ACP has stated in the permit application that each unit will meet a post-control NO_x emission rate of 5 ppm at 15% O₂.

It is important to note that the preamble of the July 6, 2006 Federal Register (71 FR 38497) states clearly that the NO_x emissions standards noted above are not continuous and do not necessarily apply during times of startup/shutdown but ACP must, pursuant to §60.4333, “operate and maintain [ACP’s] stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.”

Section §60.4330(a) requires that a stationary combustion turbine located in a continental area meet either: (1) an SO₂ standard of 0.90 lb/MW-hr gross energy output or (2) not combust a any fuel which contains total potential sulfur emissions in excess of 0.060 lb-SO₂/mmBtu heat input. Additionally, §60.4365(a) exempts the permittee from monitoring fuel sulfur content (to show compliance with §60.4330(a)(2)) if a source burns only natural gas that is covered by a purchase or transportation contract that limits sulfur to no more than 20 grains per 100 scf. ACP will show compliance with this requirement.

Subpart KKKK also includes general compliance requirements (60.4333), monitoring requirements (60.4335-60.4370), reporting requirements (60.4375-60.4395), and performance testing requirements (60.4400-60.4415).

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution - (NON APPLICABILITY)

On April 27, 2012, the USEPA issued a final rule (with amendments finalized on August 16, 2012) that consists of federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that currently are not regulated at the federal level. Each potentially applicable section of Subpart OOOO is discussed below.

Pneumatic Controllers - (NON APPLICABILITY)

Pursuant to §60.5365(d)(2), “[f]or the natural gas production segment (between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not including natural gas processing plants), each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh” that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. According to information provided by ACP, as the Marts Compressor Station is located after the point of custody transfer, any pneumatic controllers are not applicable to this section of Subpart OOOO.

Storage Tanks - (NON APPLICABILITY)

Pursuant to §60.5365(e), for “[e]ach storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment” that is constructed after August 23, 2011 and, pursuant to §60.5395 has “VOC emissions equal to or greater than 6 tpy” must meet the control requirements under §60.5395 as of October 15, 2013. The substantive requirement is to “reduce VOC emissions by 95.0 percent or greater.” ACP’s storage tanks are potentially applicable to this section of Subpart OOOO. However, the PTE of each storage tank is far below 6 TPY and, therefore, the storage tanks are not subject to Subpart OOOO.

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Marts Compressor Station is defined as an area source of HAPs (see Attachment B), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that “[a] new or reconstructed stationary RICE located at an area source” is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by “meeting the requirements of . . . 40 CFR part 60 subpart JJJJ, for spark ignition engines.” Pursuant to §63.6590(a)(2)(iii), a “stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006.” The Caterpillar G3516C 4SLB 2,098 hp emergency generator proposed for the Marts Compressor Station is defined as a new stationary RICE and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the proposed Marts Compressor Station and that are not classified as “criteria pollutants.” Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM₁₀ and PM_{2.5}), and Sulfur Dioxide (SO₂). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following table lists each HAP with a facility-wide PTE above 0.05 TPY and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 4: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Acetaldehyde	VOC	Yes	B2 - Probable Human Carcinogen
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
n-Hexane	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the proposed facility are less than applicability thresholds that would define the proposed facility as “major” under 45CSR14 and, therefore, no air

quality impacts modeling analysis was required. Additionally, based on the nature and location of the proposed source, an air quality impacts modeling analysis was not required under §45-13-7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

Refer to Section 4.2 of the draft permit for the unit-specific monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR).

PERFORMANCE TESTING OF OPERATIONS

Refer to Section 4.3 of the draft permit for the unit-specific performance testing requirements.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3271 to Atlantic Coast Pipeline, LLC for the proposed construction and operation of the Marts Compressor Station located near Jane Lew, Lewis County, WV.



Joe Kessler, PE
Engineer



Date

Attachment A

Atlantic Coast Pipeline, LLC

R13-2371: 041-00076

Marts Compressor Station

Table A1: Combustion Turbine Uncontrolled Emission Factors and Control Percentages

Turbine ID Number	Turbine Model	bhp	MDHI	Uncontrolled Emission Factors						
				CO	NOx	PM _{2.5} /PM ₁₀ /PM	SO ₂	UHC	CH ₂ O	Total HAPs
CT-4	Taurus 60	7,700	71.40 lb/mmBtu	4.00 lb/hr	2.40 lb/hr	1.50 lb/hr	0.0034 lb/mmBtu	2.30 lb/hr	0.00288 lb/mmBtu	0.00305 lb/mmBtu
CT-3	Taurus 70	10,915	94.50 lb/mmBtu	5.30 lb/hr	3.20 lb/hr	1.90 lb/hr	0.0034 lb/mmBtu	3.10 lb/hr	0.00288 lb/mmBtu	0.00305 lb/mmBtu
CT-2	Mars 100	15,900	140.00 lb/mmBtu	7.90 lb/hr	4.70 lb/hr	2.90 lb/hr	0.0034 lb/mmBtu	4.50 lb/hr	0.00288 lb/mmBtu	0.00305 lb/mmBtu
CT-1	Titan 130	20,500	170.00 lb/mmBtu	9.60 lb/hr	5.70 lb/hr	3.50 lb/hr	0.0034 lb/mmBtu	5.50 lb/hr	0.00288 lb/mmBtu	0.00305 lb/mmBtu
Control %				80%	44%	0%	0%	50%	50%	50%

Table A2: Combustion Turbine PTE

Turbine ID Number	Turbine Model	Operational Mode	CO		NO _x		PM _{2.5} /PM ₁₀ /PM		SO ₂		VOC		Formaldehyde		Total HAPs	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
CT-4	Taurus 60	Normal	0.80	3.47	1.33	5.78	1.50	6.57	0.24	1.06	0.12	0.50	0.10	0.45	0.11	0.47
		Low-Temp	4.80	0.12	17.80	0.45					0.23	0.01	0.21	0.01	0.22	0.01
		Startup	385.50	3.21	4.20	0.04					4.44	0.04	3.97	0.03	4.20	0.04
		Shutdown	198.00	1.65	2.40	0.02					2.28	0.02	2.04	0.02	2.16	0.02
CT-4 Total			8.45	8.45	6.28	6.28	6.57	6.57	1.06	1.06	0.56	0.56	0.50	0.50	0.53	
CT-3	Taurus 70	Normal	1.06	4.60	1.78	7.71	1.90	8.32	0.32	1.41	0.16	0.67	0.14	0.59	0.14	0.63
		Low-Temp	6.36	0.16	23.60	0.59					0.31	0.01	0.27	0.01	0.29	0.01
		Startup	438.60	3.66	4.80	0.04					5.04	0.04	4.42	0.04	4.69	0.04
		Shutdown	560.40	4.67	6.60	0.06					6.36	0.05	5.58	0.05	5.91	0.05
CT-3 Total			13.08	8.40	8.40	8.40	8.32	8.32	1.41	1.41	0.78	0.78	0.68	0.68	0.72	
CT-2	Mars 100	Normal	1.58	6.85	2.61	11.33	2.90	12.70	0.48	2.08	0.23	0.98	0.20	0.87	0.21	0.93
		Low-Temp	9.48	0.24	34.70	0.87					0.45	0.01	0.40	0.01	0.43	0.01
		Startup	741.00	6.18	8.40	0.07					8.52	0.07	7.63	0.06	8.08	0.07
		Shutdown	895.20	7.46	10.20	0.09					10.20	0.09	9.14	0.08	9.68	0.08
CT-2 Total			20.73	13.35	12.35	12.35	12.70	12.70	2.08	2.08	1.14	1.14	1.02	1.02	1.09	
CT-1	Titan 130	Normal	1.92	8.33	3.17	13.74	3.50	15.33	0.58	2.53	0.28	1.19	0.24	1.06	0.26	1.12
		Low-Temp	11.52	0.29	42.20	1.06					0.55	0.01	0.49	0.01	0.52	0.01
		Startup	1062.00	8.85	11.40	0.10					12.12	0.10	10.79	0.09	11.43	0.10
		Shutdown	1248.00	10.40	14.40	0.12					14.28	0.12	12.71	0.11	13.46	0.11
CT-1 Total			27.87	15.01	15.01	15.33	15.33	2.53	2.53	1.43	1.43	1.27	1.27	1.35		

Attachment B: Facility-Wide PTE
Atlantic Coast Pipeline, LLC: Marts Compressor Station
Permit Number R13-3271: Facility ID 041-00076

Emission Unit	EP ID	CO		NO _x		PM ¹⁰		SO _x		VOC		Formaldehyde		Total HAPs	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Solar Titan 130 ⁽²⁾	CT-1	1.92	27.87	3.17	15.01	3.50	15.33	0.58	2.53	0.28	1.43	0.24	1.27	0.26	1.35
Solar Mars 100 ⁽²⁾	CT-2	1.58	20.73	2.61	12.35	2.90	12.70	0.48	2.08	0.23	1.14	0.20	1.02	0.21	1.09
Solar Taurus 70 ⁽²⁾	CT-3	1.06	13.08	1.78	8.40	1.90	8.32	0.32	1.41	0.16	0.78	0.14	0.68	0.14	0.72
Solar Taurus 60 ⁽²⁾	CT-4	0.80	8.45	1.33	6.28	1.50	6.57	0.24	1.06	0.12	0.56	0.10	0.50	0.11	0.53
Caterpillar G3516C EG	EG-01	9.02	0.45	2.31	0.12	0.14	0.01	0.01	~0.00	4.86	0.24	2.41	0.12	0.43	0.02
Boiler	WH-1	0.88	3.86	0.53	2.30	0.08	0.35	0.01	0.03	0.06	0.25	~0.00	~0.00	0.02	0.09
Storage Tanks	TK-1, TK-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.35	0.00	0.00	0.00	0.00
Truck Loading	LR-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	0.01	0.00	0.00	~0.00	~0.00
Fugitives	FUG-01, FUG-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	51.50	0.00	0.00	n/a	2.91
Facility-Wide Total →		15.26	74.44	11.73	44.46	10.02	43.28	1.64	7.11	11.04	56.26	3.09	3.59	1.17	6.71
Facility-Wide PTE⁽³⁾ →		15.26	74.44	11.73	44.46	10.02	43.28	1.64	7.11	11.04	4.76	3.09	3.59	1.17	3.80

(1) All particulate matter emissions are assumed to be 2.5 microns or less.

(2) Hourly emissions of CO, NO_x, VOC and Formaldehyde represent those during normal, non-low temperature operation. Much higher calculated hourly emissions may occur during low-temperature and turbine startup/shutdowns. See Attachment A for these potential emissions. Annual emissions represent input from all operating scenarios at permit limited operational hours.

(3) PTE does not include fugitive emissions. No individual HAP has a PTE over 10 TPY (formaldehyde is the largest contributor). As the PTE of all individual HAPs are less than 10 TPY the PTE of total HAPs is less than 25 TPY, the Marts Compressor Station is defined as a minor (area) source for purposes of 40 CFR 61 and 40CFR63.

INTERNAL PERMITTING DOCUMENT TRACKING MANIFEST

Company Name ATLANTIC COAST PIPELINE, LLC

Permitting Action Number R13-3271 Total Days 237 DAQ Days 76

Permitting Action:

- | | | |
|---|---|--------------------------------------|
| <input type="radio"/> Permit Determination | <input type="radio"/> Temporary | <input type="radio"/> Modification |
| <input type="radio"/> General Permit | <input type="radio"/> Relocation | <input type="radio"/> PSD (Rule 14) |
| <input type="radio"/> Administrative Update | <input checked="" type="radio"/> Construction | <input type="radio"/> NNSR (Rule 19) |

Documents Attached:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Engineering Evaluation/Memo | <input checked="" type="checkbox"/> Completed Database Sheet |
| <input checked="" type="checkbox"/> Draft Permit | <input type="checkbox"/> Withdrawal |
| <input checked="" type="checkbox"/> Notice | <input type="checkbox"/> Letter |
| <input type="checkbox"/> Denial | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Final Permit/General Permit Registration | _____ |

Date	From	To	Action Requested
5/11/10	Joe Kessler	Bev McKeone	NOTICE APPROVAL
5/19	Bw	Joe	Cost Notice

NOTE: Retain a copy of this manifest for your records when transmitting your document(s).

Kessler, Joseph R

From: Laurence A Labrie (Services - 6) <laurence.a.labrie@dom.com>
Sent: Monday, September 21, 2015 11:44 AM
To: Kessler, Joseph R
Subject: Marts Compressor Station Application
Attachments: ACP FINAL Marts Compressor Station Permit Application 9-16-2015.pdf

Attached is the Marts Compressor Station application.

Laurence Labrie, CCM
Environmental Projects Advisor
Dominion Resource Services, Inc.
5000 Dominion Boulevard, 2NE
Glen Allen, Virginia 23060
Office: 804-273-3075
Mobile: 804-347-9592



CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

Entire Document
NON-CONFIDENTIAL

ID. No. 041-00076 Reg. 3271
Company ATLANTIC COAST PIPELINE
Facility MARTS Region _____
Initials JRL

Kessler, Joseph R

From: Laurence A Labrie (Services - 6) <laurence.a.labrie@dom.com>
Sent: Monday, October 12, 2015 3:40 PM
To: Kessler, Joseph R
Cc: 'Andrew Woerner'
Subject: Marts Compressor Station
Attachments: Marts Compressor Station Public Notice Certification.pdf

Attached is the publication certificate for the Marts Compressor Station air quality permit application notice.

Larry Labrie
Phone: 804-273-3075
Mobile: 804-347-9592

CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

Kessler, Joseph R

From: William A Scarpinato (Services - 6) <william.a.scarpinato@dom.com>
Sent: Thursday, October 15, 2015 11:07 AM
To: Kessler, Joseph R
Cc: Laurence A Labrie (Services - 6)
Subject: FW: Marts Compressor Station
Attachments: Marts Compressor Station Public Notice Certification.pdf

Joe,

I was talking with Larry about the items you requested. You are correct that the public notice in the application was incorrect, the actual notice that ran state R13 not General Permit. Larry had forwarded this to you earlier this week (see attached PDF), but if your inbox is like my inbox it is easy to miss things. I have my project controls people looking into the check, they assured me that there was plenty of money in the account. The rest of the information you requested will be submitted to you in a single package.

Thanks,

Bill Scarpinato

From: Laurence A Labrie (Services - 6)
Sent: Thursday, October 15, 2015 10:05 AM
To: William A Scarpinato (Services - 6)
Subject: FW: Marts Compressor Station

Sent Joe Kessler notice.

Larry Labrie
Phone: 804-273-3075
Mobile: 804-347-9592

From: Laurence A Labrie (Services - 6)
Sent: Monday, October 12, 2015 3:40 PM
To: Joseph Kessler (joseph.r.kessler@wv.gov)
Cc: 'Andrew Woerner'
Subject: Marts Compressor Station

Attached is the publication certificate for the Marts Compressor Station air quality permit application notice.

Larry Labrie
Phone: 804-273-3075
Mobile: 804-347-9592

CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents

of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

Kessler, Joseph R

From: William A Scarpinato (Services - 6) <william.a.scarpinato@dom.com>
Sent: Friday, October 16, 2015 2:00 PM
To: Kessler, Joseph R
Cc: Laurence A Labrie (Services - 6); Robert M Bisha (Services - 6)
Subject: FW: ACP Returned Check

Joe,

I think there was a clerical error (see e-mail below) by the bank, our folks are going to try and get this fixed on our end, I will let you know what comes of that.

Thanks,
Bill Scarpinato

Regards,
Bill Scarpinato, Jr.
Manager, Environmental – **Atlantic Coast Pipeline**
Dominion Resources Services, Inc.
O: (804) 273-3019
C: (804) 461-1426
5000 Dominion Blvd, Glen Allen, VA 23060
William.A.Scarpinato@dom.com



 Please consider the environment before printing this email

From: Adrienne M Lambert (Energy - 6)
Sent: Friday, October 16, 2015 1:14 PM
To: William A Scarpinato (Services - 6)
Subject: ACP Returned Check

Hi Bill,

There was an issue with the name on the check matching the bank's list. The bank made an error and returned the check, rather than contacting Dominion to ask if we wanted to pay. Accounts Payable will prepare the necessary documents and pay the vendor.

Please let me know if you have any questions.

Thanks,

Adrienne Lambert

Financial Controls
8th and Main, 15th Floor
Phone: (804) 775-5972
Mobile: 804-356-5499

CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

Kessler, Joseph R

From: Kessler, Joseph R
Sent: Tuesday, March 15, 2016 10:00 AM
To: William A Scarpinato (william.a.scarpinato@dom.com)
Subject: Marts Compressor Station
Attachments: Attachment A.xlsx

Bill, working on the Marts permit application and have a few additional technical questions:

- 1) The steady-state emissions from the combustion turbines are given in (multi-colored) tables in Attachment N of the permit application. I assume these were provided by Solar, but are they available on official Solar documentation?
- 2) Odd spike of CO emissions at 59 degrees for Mars 100. Assume this is a typo?
- 3) It would seem likely that during low-load and low-temperature operations that Total HAPS and Formaldehyde emissions would also be higher than during normal operation. Therefore, as no emission factors are available during these scenarios, I based emissions on the same percentage of formaldehyde/HAPs to VOC as during normal operation. See attached spreadsheet.
- 4) The emergency generator VOC emissions in the application do not include the formaldehyde emission factor given in the cat spec sheet. Total VOCs should be sum of NMNEHC and CHOH.
- 5) Please provide basis for percent VOC/HAP in the natural gas fugitive emissions.
- 6) What is the source for the scf/event of gas release during blowdowns?
- 7) What is the source of the pipeline fluids analysis used in TANKs program?

Thanks,

Joe Kessler, PE
Engineer
West Virginia Division of Air Quality
601-57th St., SE
Charleston, WV 25304
Phone: (304) 926-0499 x1219
Fax: (304) 926-0478
Joseph.r.kessler@wv.gov

Kessler, Joseph R

From: Laurence A Labrie (Services - 6) <laurence.a.labrie@dom.com>
Sent: Thursday, March 17, 2016 1:15 PM
To: Kessler, Joseph R
Subject: Contact Information

Laurence Labrie
Environmental Projects Advisor
Dominion Resource Services, Inc.
5000 Dominion Boulevard, 2NE
Glen Allen, Virginia 23060
Office: 804-273-3075
Mobile: 804-347-9592

CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060

Web Address: www.dom.com



I.D. No. 041-00076 Reg. 3271
Company ATLANTIC COAST PIPELINE
Facility MARTS Region _____
Initials JM

May 3, 2016

BY: OVERNIGHT MAIL

Joseph Kessler
Engineer
West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304



Subject: Marts Compressor Station
Permit Application: R13-3271
Plant ID No.: 041-00076
Response to Questions

Entire Document
NON-CONFIDENTIAL

Dear Mr. Kessler:

Atlantic Coastal Pipeline, LLC (ACP) is submitting this letter in response to the questions and comments you provided in a February 25, 2016 email to Mr. Bill Scarpinato. Each of the questions raised in your email are provided below for reference, followed by ACP's responses.

1. The steady-state emissions from the combustion turbines are given in (multi-colored) tables in Attachment N of the permit application. I assume these were provided by Solar, but are they available on official Solar documentation?

Response: ACP is still finalizing contracts and will be able to provide vendor guarantees if needed at later date. The selective catalytic reduction control performance for nitrogen oxides and oxidation catalyst control performance for carbon monoxide and volatile organic compounds are provided by the expected control manufacturer, Peerless. This information is included in Attachment 1 with the data for the Solar turbines to be installed at the Marts compressor station (highlighted). The emission reduction percentages of 44% for selective catalytic reduction and 80% for the oxidation catalyst are for the air pollution control devices intended for operation with the Solar turbines. The emission estimate examples are at a site elevation of 1500 feet and 100°F ambient temperature.

2. Odd spike of CO emissions at 59 degrees for Mars 100. Assume this is a typo?

Response: Solar reviewed the Mars 100 emissions data and determined that the 100% load CO and UHC/VOC data at 59°F are not correct. The Mars 100 emissions data are contained in Attachment 2 with corrected values:

- CO - 8.6 lb/hr changed to 7.1 lb/hr
- UHC - 4.9 lb/hr changed to 4.0 lb/hr
- VOC - 0.5 lb/hr changed to 0.4 lb/hr

The 50% load case predicted values are consistent with the expected operation at the lower bound of SoLoNOx operation.

3. It would seem likely that during low-load and low-temperature operations that Total HAPS and Formaldehyde emissions would also be higher than during normal operation. Therefore, as no emission factors are available during these scenarios, I based emissions on the same percentage of formaldehyde/HAPs to VOC as during normal operation. See Attachment 2 spreadsheet.

Response: ACP agrees with the approach that WVDAQ has taken to estimate formaldehyde and HAP emissions at low-load and low-temperature scenarios. The proposed changes to emissions based upon this update are acceptable.

4. The emergency generator VOC emissions in the application do not include the formaldehyde emission factor given in the CAT spec sheet. Total VOCs should be the sum of NMNEHC and CHOH.

Response: ACP has updated the emergency generator emission unit data sheet to reflect the inclusion of formaldehyde emissions in the VOC totals, which is included as Attachment 3 of this submittal.

5. Please provide basis for percent VOC/HAP in the natural gas fugitive emissions.

Response: The natural gas fugitive emissions utilize the same gas analysis as was provided with the blowdown emission calculations, detailed below from submittal.

Gas Composition			
	Molecular Weight (lb/lb-mol)	Molar (Volume) Fraction (mol%)	Wt. Fraction[1] (wt. %)
Total Stream Molecular Weight	16.89		
<i>Non-VOC</i>			
Carbon Dioxide	44.01	1.041%	2.71%
Nitrogen	28.01	0.994%	1.65%
Methane	16.04	94.21%	89.47%
Ethane	30.07	2.923%	5.20%
<i>VOC</i>			
Propane	44.10	0.546%	1.43%
n-Butane	58.12	0.084%	0.29%
IsoButane	58.12	0.079%	0.27%
n-Pentane	72.15	0.022%	0.09%
IsoPentane	72.15	0.024%	0.10%
n-Hexane	78.11	0.032%	0.15%
n-Heptane	100.21	0.049%	0.29%
Total VOC Fraction			2.62%
Total HAP Fraction			0.15%

6. What is the source for the scf/event of gas release during blowdowns?

Response: The source of the volume of gas released during blowdowns is an engineering estimate from another, similar station, based upon the size of the pipeline, length of pipe between isolation valves, pressure, temperature, and compressibility of the gas through the station. The estimation is intentionally conservative at this point in the design process to account for slight variations that would exist during normal operations.

7. What is the source of the pipeline fluids analysis used in TANKs program?

Response: The pipeline fluids emission calculations were determined utilizing the known separator gas stream and an estimated tank throughput based upon the expected fluid removal, given the specification of the pipeline gas, and based upon throughputs experienced at similar transmission stations. The throughput values are conservative. Pipeline fluids tanks are often filled only about 1 time per year or less. A value of five turnovers per year is very conservative.

Since there is potential for flash emissions from the pipeline fluids, E&P Tanks was used to estimate emissions as noted in the application. The gas analysis utilized for this simulation was the same analysis that was utilized to estimate emissions from blowdowns and from natural gas fugitive emissions.

Of the used oil tank, the fluid composition used to determine working and breathing emissions was taken from the EPA Tank database for used oil mixtures. The contents of this tank are expected to be used oil from engine oil changes and are characteristic of the EPA TANKS Used Oil classification.

If you have questions about this submittal, please do not hesitate to contact Mr. William Scarpinato at (804) 273-3019 or at william.a.scarpinato@dom.com.

Very truly yours,



Robert M. Bisha, Technical Advisor
Atlantic Coast Pipeline
Dominion Environmental Services

Attachment 1: Peerless Emissions Data
Attachment 2: Solar Mars 100 Emissions Data
Attachment 3: Emergency Generator Emission Unit Data Sheet

Attachment 1

PEERLESS EMISSIONS DATA

SCR CATALYST DESIGN DATASHEET

ENQUIRY DETAILS	
Enquiry Number	32237
Revision	0
Date of Revision	28-May-2015
Project Name	Atlantic Coast Pipeline
Project Location	Marta
Application	Simple Cycle
Number of SCRs	17

PROCESS DATA		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12
Design Case		Centaur 40	Centaur 40	Centaur 50L	Centaur 50L	Taurus 60	Taurus 60	Taurus 70	Taurus 70	Mars 100	Mars 100	Titan 130	Titan 130
Customer Design Case		Centaur 40	Centaur 40	Centaur 50L	Centaur 50L	Taurus 60	Taurus 60	Taurus 70	Taurus 70	Mars 100	Mars 100	Titan 130	Titan 130
Percent Load	Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fuel Case	Percent	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
EXHAUST GAS EMISSIONS DATA (BEFORE COOLING)													
Exhaust Gas Mass Flowrate, Wet	lb/h	164894	127403	181184	127484	180880	151784	247255	178224	357228	289445	437956	341226
Exhaust Gas Volumetric Flowrate, Wet	ACFM	87289	73508	91761	80971	107807	96552	139452	112363	207183	177388	254955	215250
Exhaust Gas Temperature	degrees F	779.0	873.0	871.0	1004.0	888.0	569.0	639.0	969.0	859.0	953.0	900.0	993.0
Exhaust Gas Composition													
Component	MW												
O2	31.999	vol% (wet)	15.76	15.29	14.80	14.08	14.50	13.92	14.30	13.69	14.72	14.23	14.40
H2O	18.015	vol% (wet)	4.67	8.15	5.55	9.21	5.81	9.34	5.91	9.30	3.81	0.06	5.90
N2	28.013	vol% (wet)	76.23	73.41	75.63	73.01	75.78	72.96	75.74	72.93	75.85	73.06	75.75
CO2	44.010	vol% (wet)	2.41	2.27	2.88	2.83	3.00	2.90	3.05	2.93	2.90	2.76	3.04
Ar	39.948	vol% (wet)	0.91	0.88	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source @ %O2 15													
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	25.00	25.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Nox as NO2	lb/h	4.66	3.44	1.95	1.55	2.38	1.88	3.20	2.28	4.51	3.44	5.66	4.43
CO	ppmvd	50.00	50.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
CO	lb/h	5.67	4.19	3.31	2.63	4.02	3.20	5.42	3.83	7.82	5.81	9.58	7.49
SO2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COOLING AIR DATA													
Cooling Air Mass Flowrate, Wet	lb/h	7181.2	27800.1	29270.9	57444.9	38705.3	67013.0	40617.2	73373.3	80074.6	104237.6	98593.9	147089.4
Cooling Air Volumetric Flowrate, Wet	ACFM	1387	8438	8653	13303	7475	15512	7739	16991	11601	24139	19040	34684
Ambient Air Temperature	degrees F	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
Relative Humidity	Percent	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
EXHAUST GAS EMISSIONS DATA (AFTER COOLING)													
Exhaust Gas Mass Flowrate, Wet	lb/h	172175	155203	190455	184929	225845	218717	287332	253197	427303	393683	536950	488325
Exhaust Gas Volumetric Flowrate, Wet	ACFM	88896	80938	13364	95292	116553	113826	148553	131945	220785	205195	277243	254484
Exhaust Gas Temperature (after cooling)	degrees F	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
Exhaust Gas Composition													
Component	MW												
O2	31.999	vol% (wet)	15.99	16.15	15.73	15.85	15.59	15.82	15.29	15.88	15.59	15.78	15.59
H2O	18.015	vol% (wet)	4.48	7.38	4.72	7.55	4.84	7.67	5.11	7.79	4.84	7.70	4.84
N2	28.013	vol% (wet)	78.30	73.71	76.21	73.65	76.76	73.61	76.05	73.95	76.15	73.59	76.13
CO2	44.010	vol% (wet)	2.31	1.87	2.43	1.97	2.50	2.03	2.63	2.10	2.50	2.04	2.49
Ar	39.948	vol% (wet)	0.91	0.88	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source @ %O2 15													
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	25.00	25.06	9.00	9.04	9.00	9.04	9.00	9.04	9.00	9.00	9.00	9.04
Nox as NO2	lb/h	4.66	3.44	1.95	1.55	2.38	1.88	3.20	2.28	4.51	3.44	5.66	4.43
CO	ppmvd	50.00	50.13	25.00	25.11	25.00	25.11	25.00	25.10	25.00	25.00	25.00	25.11
CO	lb/h	5.67	4.19	3.31	2.63	4.02	3.20	5.42	3.83	7.82	5.81	9.58	7.49
SO2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Particulates	kg/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trace Elements	mg/Nm3 (dry)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amount of Nox as NO2	Percent	50	50	50	50	50	50	50	50	50	50	50	50
Nox Reduction	Percent	80.00	80.00	84.44	84.44	84.44	84.44	84.44	84.44	84.44	84.44	84.44	84.44
Dilution Air Required	lb/h	327	327	327	327	327	327	327	327	327	327	327	327
Dilution Air Required	SCFM	68	68	68	68	68	68	68	68	68	68	68	68
Aqueous Ammonia Requirement	lb/h	11	8	6	5	7	5	8	7	14	10	17	13
Aqueous Ammonia Requirement	gal/month	1046	772	569	452	582	551	992	658	1311	1000	1648	1299
Total Mass Injected by SCR	lb/h	338	336	333	332	334	333	337	334	341	337	344	340
Exhaust Gas Mass Flowrate, Wet at SCR Catalyst	lb/h	172513.1	155538.2	190787.8	185299.6	225919.5	219049.7	287664.9	253531.1	427943.2	394070.0	537094.1	488565.8
Exhaust Gas Vol Flowrate, Wet at SCR Catalyst	ACFM	88073	81113	98556	96485	116732	114083	148722	132119	220962	205371	277421	254642
Performance Warranties @ %O2 15													
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Nox as NO2	lb/h	0.93	0.69	1.09	0.86	1.32	1.05	1.78	1.29	2.50	1.91	3.15	2.48
NH3 Slip	ppmvd	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
NH3 Slip	lb/h	0.89	0.51	0.80	0.64	0.98	0.78	1.32	0.93	1.85	1.41	2.33	1.82
ACFU Selected		AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15	AOEL15
SO2 to SO3 Conversion	Percent	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA
Pressure Drop across the catalyst	inh2O	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA

*VTA = Vendor to Advise

SITE/AMBIENT CONDITIONS	
Design Ambient Temperature	100 degrees F
Design Ambient Pressure	407 inh2O
Site Elevation	1900 ft
Gauge Duct Pressure	20.00 inh2O
Relative Humidity	60 Percent

ACFU DESIGN	
Reagent	Aqueous Ammonia
Reagent Concentration	19.00 %w/w

CO CATALYST DESIGN DATASHEET

ENQUIRY DETAILS	
Enquiry Number	32237
Revision	0
Date of Revision	26-May-2015
Project Name	Atlantic Coast Pipeline
Project Location	Matts
Application	Simple Cycle
Number of SCRICO Systems	17

PROCESS DATA	Case 1		Case 2		Case 3		Case 4		Case 5		Case 6		Case 7		Case 8		Case 9		Case 10		Case 11		Case 12			
	Centaur 40	Centaur 40	Centaur 40	Centaur 50L	Centaur 60	Centaur 60	Centaur 60	Centaur 70																		
Design Case	15-994.0	127403.0	161184.0	127464.0	166950.0	151700.0	247267.0	173824.0	367228.0	289445.0	437866.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	
Customer Design Case	15-994.0	127403.0	161184.0	127464.0	166950.0	151700.0	247267.0	173824.0	367228.0	289445.0	437866.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	215260.0	
Percent Load	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Fuel Case	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	
Exhaust Gas Mass Flowrate, Wet	97269	73508	91761	89671	107907	90802	139492	177353	354985	277353	437866	215260	215260	215260	215260	215260	215260	215260	215260	215260	215260	215260	215260	215260	215260	
Exhaust Gas Volumetric Flowrate, Wet	779.0	873.0	871.0	1004.0	989.0	989.0	1394.92	1773.53	3549.85	2773.53	4378.66	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	2152.60	
Exhaust Gas Temperature																										
Exhaust Gas Composition																										
Component																										
O2	15.76	15.29	14.80	14.00	14.30	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	14.39	
H2O	4.67	8.15	5.55	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	9.21	5.61	
N2	76.23	73.41	75.68	73.01	75.78	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	72.98	76.24	
CO2	2.41	2.27	2.86	2.83	3.03	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	2.93	3.55	
Ar	0.91	0.88	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	
CO	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
NOx as NO2	50.00	50.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	
SO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SO3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Particulates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Trace Elements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Amount of NOx as NO2	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
CO Reduction	90.00	90.00	80.00	80.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	
Performance Warranties																										
CO	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
CO	0.57	0.42	0.86	0.83	0.83	0.84	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
VOC	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	
SO2 to SO3 Conversion*	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	
NO to NO2 Conversion*	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	
VOC Reduction*	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	
Pressure Drop across the catalyst*	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	
* VTA = Vendor to Advise																										

SITE/AMBIENT CONDITIONS	
Ambient Temperature	100
Ambient Pressure	407
Site Elevation	1500
Gauge Duct Pressure	20.00
Relative Humidity	80

Solar Turbines Emissions Estimates

Mars 100-16000S

Assumptions: pipeline natural gas, sea level, 4" inlet/outlet losses, nominal performance

50% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	8787	73.11	30.58	9	2.6	25	4.4	25	2.5	2.5	0.25	9609	0.02	1.6	650	296,129
59	7760	85.24	23.16	9	3.1	25	5.2	25	3	2.5	0.30	11107	0.02	1.9	949	275,560
100	6580	75.95	22.05	9	2.7	25	4.5	25	2.6	2.5	0.26	9713	0.02	1.7	1009	240842
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	13180	115.67	28.99	9	4.2	25	7.1	25	4.0	2.5	0.40	15149	0.02	2.5	870	355,319
59	11640	101.99	29.04	9	3.7	25	6.2	25	3.5	2.5	0.35	13280	0.02	2.2	916	310,038
100	9870	90.11	27.87	9	3.2	25	5.4	25	3.1	2.5	0.31	11519	0.02	2.0	965	271481
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	17574	129.64	34.49	9	4.7	25	7.9	25	4.5	2.5	0.45	16963	0.02	2.9	864	366,922
59	15519	116.41	33.92	9	4.2	25	7.1	25	4.0	2.5	0.40	15148	0.02	2.6	908	334,207
100	13160	104.09	32.17	9	3.7	25	6.2	25	3.6	2.5	0.36	13299	0.02	2.3	945	298619

Attachment 3

EMERGENCY GENERATOR EMISSION UNIT DATA SHEET

Attachment L

Affected Sources Data

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Source Identification Number ¹		EG-01	
Engine Manufacturer and Model		CATERPILLAR G3516C	
Manufacturer's Rated bhp/rpm		2,046 BHP @1800 RPM	
Source Status ²		New Source (NS)	
Date Installed/Modified/Removed ³		2016	
Engine Manufactured/Reconstruction Date ⁴		NA	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No) ⁵		Yes	
Engine, Fuel and Combustion Data	Engine Type ⁶	LB4S	
	APCD Type ⁷	NA	
	Fuel Type ⁸	PG	
	H ₂ S (gr/100 scf)	0.25	
	Operating bhp/rpm	2,046 BHP @1800 RPM	
	BSFC (Btu/bhp-hr)	6,935	
	Fuel throughput (ft ³ /hr)	16,080	
	Fuel throughput (MMft ³ /yr)	8.04	
	Operation (hrs/yr)	500	
Reference ⁹	Potential Emissions ¹⁰	lbs/hr	tons/yr
Vendor Guarantee	NO _x	0.03	0.12
Vendor Guarantee	CO	0.10	0.45
Vendor Guarantee	VOC	2.45	0.12
AP-42 Chapter 3.2	SO ₂	<0.001	<0.001
AP-42 Chapter 3.2	PM ₁₀	0.01	0.03
Vendor Guarantee	Formaldehyde	2.41	0.12

Attachment L

Affected Sources Data

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.
2. Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Removal of Source
3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.
4. Enter the date that the engine was manufactured, modified or reconstructed.
5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6. Enter the Engine Type designation(s) using the following codes:

LB2S	Lean Burn Two Stroke	RB4S	Rich Burn Four Stroke
LB4S	Lean Burn Four Stroke		
7. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	SCR	Lean Burn & Selective Catalytic Reduction
8. Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas
----	------------------------------	----	-----------------
9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

MD	Manufacturer's Data	AP	AP-42
GR	GRI-HAPCalc™	OT	Other _____ (please list)
10. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

Kessler, Joseph R

From: Kessler, Joseph R
Sent: Thursday, February 25, 2016 11:51 AM
To: William A Scarpinato (william.a.scarpinato@dom.com)
Cc: Kessler, Joseph R
Subject: R13-3271 Permit Application Review Status

**RE: Application Status: Complete
Atlantic Coast Pipeline, L.L.C.
Marts Compressor Station
Permit Application: R13-3271
Plant ID No.: 041-00076**

Dear Mr. Scarpinato:

Your application for a construction permit was received by the Division of Air Quality (DAQ) on September 15, 2015 and assigned to the writer for review. Upon an initial review of the application, it was determined that additional items needed to be addressed prior to the application being deemed complete. An e-mail was sent to you detailing these items on October 15, 2015. These items have now been addressed, and, as of the date of this e-mail, the application has been deemed complete. Therefore, the 90-day statutory review period commenced on that date.

This determination of completeness shall not relieve the permit applicant of the requirement to subsequently submit, in a timely manner, any additional or corrected information deemed necessary for a final permit determination.

Should you have any questions, please contact me at (304) 926-0499 ext. 1219 or reply to this email.

Thank You,

Joe Kessler, PE
Engineer
West Virginia Division of Air Quality
601-57th St., SE
Charleston, WV 25304
Phone: (304) 926-0499 x1219
Fax: (304) 926-0478
Joseph.r.kessler@wv.gov

Entire Document
NON-CONFIDENTIAL

Kessler, Joseph R

From: Ward, Beth A
Sent: Thursday, October 29, 2015 10:26 AM
To: Kessler, Joseph R
Subject: Atlantic Coast Pipeline LLC Permit Application Fee

This is the receipt for payment received from:

Atlantic Coast Pipeline LLC, Marts Compressor Station, CHECK NUMBER 000159, CHECK DATE 10/23/2015, \$4500.00
R13-3271 ID# 041-00076

OASIS Deposit CR 1600048112

Thank You!

Beth Ward

**WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
BTO FISCAL
601 57TH STREET SE
CHARLESTON, WV 25304
(304) 926-0499 EXT 1846
beth.a.ward@wv.gov**

UC Defaulted Accounts Search Results

Sorry, no records matching your criteria were found.

FEIN:

Business name: ATLANTIC COAST PIPELINE, L.L.C.

Doing business

as/Trading as:

Please use your browsers back button to try again.

WorkforceWV	Unemployment Compensation	Offices of the Insurance Commissioner
-----------------------------	---	---

UC Defaulted Accounts Search Results

Sorry, no records matching your criteria were found.

FEIN: 471813950
Business name:
Doing business as/Trading as:

Please use your browsers back button to try again.

WorkforceWV	Unemployment Compensation	Offices of the Insurance Commissioner
-----------------------------	---	---

Environmental Resources Management
204 Chase Drive
Hurricane, WV 25526

November 20th, 2015

Mr. Joe Kessler
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, West Virginia 25304



HAND DELIVERED

Dear Director Durham:

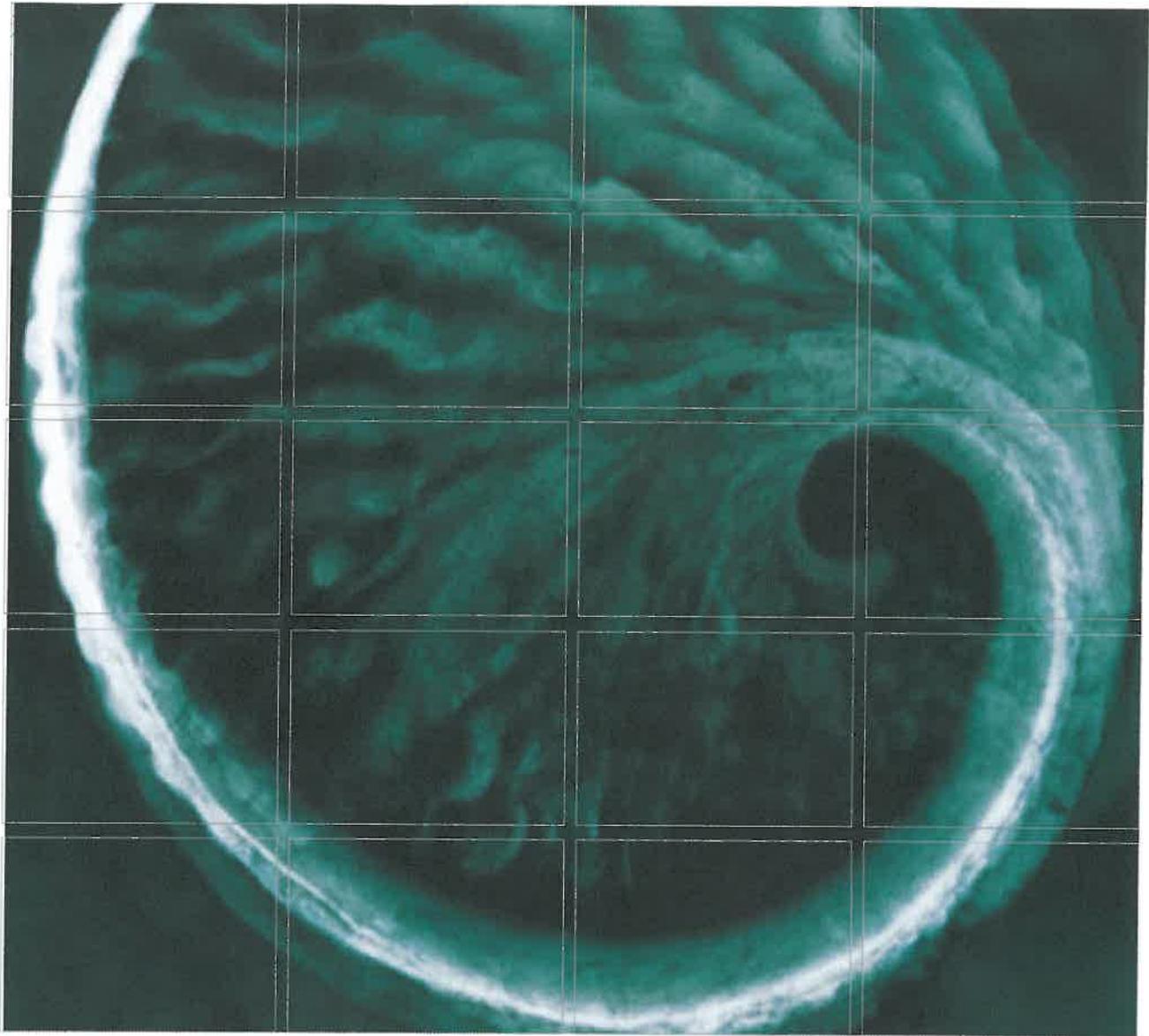
On behalf of Atlantic Coastal Pipeline, LLC., Environmental Resources Management (ERM) is delivering an application for a Rule 13 Construction Permit for the Marts Compressor Station located in Wetzel County, West Virginia. The hard-copy submittal is being mailed to the WVDAQ from Atlantic Coastal Pipeline, LLC. Included with this submittal are the two (2) full PDFs included on CD-ROM of the permit application.

Sincerely,

Grant Morgan
ERM

Entire Document
NON-CONFIDENTIAL

I.D. No. 041-00076 Reg. 3271
Company AC PIPELINE
Facility MARTS
Initials JM



Prepared For:

Atlantic Coast Pipeline, LLC

Atlantic Coast Pipeline Project
Permit Application
Marts Compressor Station
Lewis County, WV



October 2015



ORIGINAL

ID. No. 041-00076 Reg. 3271

Company ACP

Facility MARTS Region _____

Initials ML

Environmental Resources Management
75 Valley Stream Parkway, Suite 200
Malvern, PA 19355

www.erm.com

The world's leading sustainability consultancy

Entire Document
NON-CONFIDENTIAL



TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 BACKGROUND	1
1.2 APPLICATION OVERVIEW	1
2.0 FACILITY AND PROJECT DESCRIPTION	2
2.1 MARTS COMPRESSOR STATION	2
2.2 AGGREGATION DETERMINATION	4
3.0 PROJECT EMISSIONS INFORMATION	5
3.1 COMBUSTION TURBINES	5
3.2 EMERGENCY GENERATOR	9
3.3 BOILER	9
3.4 FUGITIVE EMISSIONS	10
3.5 STORAGE TANKS	11
3.6 TANK UNLOADING OPERATIONS	12
3.7 PROJECT EMISSIONS	12
4.0 FEDERAL REGULATORY REQUIREMENTS	14
4.1 NEW SOURCE PERFORMANCE STANDARDS (NSPS)	14
4.1.1 40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial- Commercial-Institutional Steam Generating Units	14
4.1.2 40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels	14
4.1.3 40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	14
4.1.4 40 CFR 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines	15
4.1.5 40 CFR 60 Subparts OOOO and OOOOa - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution	15

4.2	<i>NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)</i>	16
4.2.1	<i>40 CFR 63 Subpart HHH - National Emissions Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities</i>	17
4.2.2	<i>40 CFR 63 Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers And Process Heaters</i>	17
4.2.3	<i>40 CFR 63 Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources</i>	17
4.2.4	<i>40 CFR 63 Subpart YYYY - National Emissions Standards for Hazardous Air Pollutants for Stationary Combustion Turbines</i>	17
4.2.5	<i>40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines</i>	17
4.3	<i>PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AND NON-ATTAINMENT NEW SOURCE REVIEW</i>	18
4.4	<i>TITLE V OPERATING PERMIT</i>	18
4.5	<i>MAINTENANCE EMISSIONS AND FEDERAL ROUTINE MAINTENANCE, REPAIR AND REPLACEMENT PROVISIONS (RMRR)</i>	18
4.6	<i>CHEMICAL ACCIDENT PREVENTION AND RISK MANAGEMENT PROGRAMS (RMP)</i>	19
4.7	<i>ACID RAIN REGULATIONS</i>	19
4.8	<i>STRATOSPHERIC OZONE PROTECTION REGULATIONS</i>	19
4.9	<i>GREENHOUSE GAS REPORTING</i>	19
5.0	<i>STATE REGULATORY APPLICABILITY</i>	20
6.0	<i>PROPOSED COMPLIANCE DEMONSTRATIONS</i>	22

LIST OF FIGURES

FIGURE 2.1 MARTS COMPRESSOR STATION LOCATION MAP

LIST OF TABLES

**TABLE 3.1 PRE-CONTROL TURBINE LOW TEMPERATURE EMISSION RATES
($< 0^{\circ}$ F AND $> -20^{\circ}$ F)**

TABLE 3.2 TURBINE CONTROLLED SHORT-TERM EMISSION RATES

TABLE 3.3 TURBINE POTENTIAL EMISSIONS DURING START-UP EVENTS

TABLE 3.4 TURBINE POTENTIAL EMISSIONS DURING SHUTDOWN EVENTS

TABLE 3.5 TURBINE POTENTIAL EMISSIONS

TABLE 3.6 EMERGENCY GENERATOR POTENTIAL EMISSIONS

TABLE 3.7 BOILER POTENTIAL EMISSIONS

TABLE 3.8 FUGITIVE COMPONENT POTENTIAL EMISSIONS

TABLE 3.9 FACILITY-WIDE POTENTIAL EMISSIONS (TPY)

TABLE 5.1 STATE REGULATORY APPLICABILITY

LIST OF APPENDICES

APPENDIX A WVDAQ AIR PERMIT APPLICATION FORMS

1.0 INTRODUCTION

1.1 BACKGROUND

Atlantic Coast Pipeline, LLC (ACP, LLC) proposes to construct and operate the Atlantic Coast Pipeline (ACP), an approximately 556-mile-long interstate natural gas transmission pipeline system designed to meet growing energy needs in Virginia and North Carolina. The proposed project has the capacity to deliver 1.5 billion standard cubic feet of natural gas per day (bscf/d) from Pennsylvania and West Virginia to power generation facilities and other end-users.

In support of the ACP, Dominion Transmission Inc. (DTI), a subsidiary of Dominion, proposes to construct and operate the Marts Compressor Station (ACP-1) in Lewis County, West Virginia to provide compression to support the transmission of natural gas. Two adjacent metering and regulation (M&R) stations will also be operated by DTI and have been included in this application. Kincheloe is an M&R station associated with ACP and the CNX M&R Station is part of an additional DTI pipeline which is part of a separate, but related project, the Supply Header Project.

1.2 APPLICATION OVERVIEW

ACP, LLC submits this Rule 13 permit application to the West Virginia Department of Environmental Protections (WVDEP), Division of Air Quality (DAQ) for the authority to construct the Marts Compressor Station in Lewis County, West Virginia. This permit application narrative is provided to add clarification and/or further detail to the permit application forms provided by the DAQ.

Concurrent with the submittal of this air quality application, other required environmental permits and approvals are being pursued with the appropriate regulatory agencies.

This section (Section 1) contains introductory information. Section 2 presents a description of the Marts Compressor Station and its associated equipment. The estimated emissions of regulated pollutants from the equipment and operating scenarios are presented in Section 3. Section 4 provides a review of federal regulatory requirements applicable to project sources and Section 5 addresses an evaluation of the applicability of State regulatory requirements. Section 6 provides ACP, LLC's proposed compliance demonstration methods.

The Plan Approval application also contains WVDAQ Permit Application Forms as Appendix A.

2.0

FACILITY AND PROJECT DESCRIPTION

2.1

MARTS COMPRESSOR STATION

The Marts Compressor Station will operate in Lewis County, West Virginia to provide compression to support the transport of natural gas. The proposed project will require the construction of a new facility subject to the requirements of WV 45 CSR 13 - "Permits for Construction, Modification, Relocation, And Operation of Stationary Sources of Air Pollutants". In addition to the Marts Compressor Station, the facility will also include nearby metering and regulating (M&R) stations (Kincheloe and CNX) in Lewis County, also operated by DTI.

ACP, LLC seeks authorization for the construction and operation of:

- One (1) Solar Titan 130 Combustion Turbine (CT-1);
- One (1) Solar Mars 100 Combustion Turbine (CT-2);
- One (1) Solar Taurus 70 Combustion Turbine (CT-3);
- One (1) Solar Taurus 60 Combustion Turbine (CT-4);
- One (1) Caterpillar Emergency Generator (EG-1) rated at 2,046 hp;
- One (1) Boiler (WH-1) rated at 10.7 Million British Thermal Units per hour (MMBtu/hr);
- One (1) Accumulator Tank (TK-1) with a capacity of 2,500 gallons;
- One (1) Hydrocarbon Waste Tank (TK-2) with a capacity of 2,000 gallons;
- One (1) Aqueous Ammonia Storage Tank (TK-3) with a capacity of 8,000 gallons; and
- Various operational natural gas releases associated with station components (FUG-01), piping fugitive emissions (FUG-02), and loading rack emissions (LR-01) related to the equipment proposed at the Marts Compressor Station.

A map displaying the location of the Marts Compressor Station is provided in Figure 2.1 of this application.

2.2

AGGREGATION DETERMINATION

The Marts Compressor Station will be operated by Dominion Transmission Inc. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. DTI will operate the Marts Compressor Station with the same industrial grouping as adjacent M&R stations. This application includes emission sources associated with the compressor station and the Kincheloe and CNX M&R stations. Other than the interstate pipeline, which is specifically exempt from the requirement to aggregate as stated in the preamble to the 1980 PSD regulations, there are no other facilities that would be considered to the Marts Compressor Station and thus no other sources must be aggregated with the Marts Compressor Station.

3.0

PROJECT EMISSIONS INFORMATION

As discussed in Section 2.1 of this application, ACP, LLC seeks the authority to construct and operate new emission sources. This section provides a description of the basis for the estimation of emissions from these sources.

3.1

COMBUSTION TURBINES

The proposed natural gas-fired turbines to be installed at the Marts Compressor Station will be equipped with Solar's SoLoNO_x dry low NO_x combustor technology as well as add-on emission controls including selective catalytic reduction (SCR) for NO_x and oxidation catalyst for CO and VOC.

Emissions for the Solar Turbines assume that the units will operate up to 8,760 hours per year and up to 100% rated output. Pre-control (SCR and oxidation catalyst) emissions of nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC) are based on emission rates provided by Solar. VOC emissions are conservatively estimated as 10% of uncombusted hydrocarbon (UHC). Solar also provided emission estimates for UHC, carbon dioxide (CO₂), formaldehyde and total hazardous air pollutants.

The pre-control emission rates for normal operating conditions are as follows (all emissions rates are in terms of parts per million dry volume (ppmvd) @ 15% O₂):

- 9 ppmvd NO_x;
- 25 ppmvd CO;
- 25 ppmvd unburned hydrocarbons (UHC); and
- 2.5 ppmvd VOC.

The proposed SCR will further reduce the NO_x emission rate for each of the proposed turbines to 5 ppmvd at 15% O₂.

Per vendor estimates, the oxidation catalyst will provide 80% control for CO, to achieve 5 ppmvd CO @ 15% O₂. The catalyst will also control organic compound emissions and will provide an estimated 50% control for VOC and formaldehyde.

Vendor estimates for SCR and oxidation catalyst performance are provided in Appendix A.

At very low load and cold temperature extremes, the turbine system must be controlled differently in order to assure stable operation. The required adjustments to the turbine controls at these conditions cause emissions of NO_x,

CO and VOC to increase (emission rates of other pollutants are unchanged). The only times when low-load operation (non-normal SoLoNO_x operation) is expected to occur are during periods of startup and shutdown. Solar has provided emissions estimates during start-up and shutdown (see Solar Product Information Letter (PIL) 170, included as part of the vendor attachments to this application for more detail).

Similarly, Solar has provided emissions estimates for low temperature operation (inlet combustion air temperature less than 0° F and greater than -20° F). Table 3.1 provides estimated pre-control emissions from the turbines at low temperature conditions.

TABLE 3.1 *PRE-CONTROL TURBINE LOW TEMPERATURE EMISSION RATES (< 0° F AND > -20° F)¹*

Applicable Load	NO _x , ppm	CO, ppm	UHC, ppm
50-100% load	120	150	50

1. Emissions Estimates from Table 2 of Solar PIL 167.

ACP, LLC reviewed historic meteorological data from the previous five years for the region to estimate the worst case number of hours per year under sub-zero (less than 0° F but greater than -20° F) conditions. The annual hours of operation during sub-zero conditions were conservatively assumed to be not more than 50 hours per year.

A summary of the potential emissions of NO_x, CO, and VOC during normal operations and low temperature scenarios is provided in Table 3.2.

TABLE 3.2 TURBINE CONTROLLED SHORT-TERM EMISSION RATES

Pollutant	Operating Scenario	CT-01	CT-02	CT-03	CT-04
		Solar Titan 130 Turbine lb/hr	Solar Mars 100 Turbine lb/hr	Solar Taurus 70 Turbine lb/hr	Solar Taurus 60 Turbine lb/hr
NO _x	Normal	3.17	2.60	1.77	1.33 ← 1.437
	Low Temp.	42.2	34.7	23.6	17.8
CO	Normal	1.92	1.58	1.06	0.80
	Low Temp.	11.52	9.48	6.36	4.80
VOC	Normal	0.28	0.23	0.16	0.12
	Low Temp.	0.55	0.45	0.31	0.23

The emission rates presented in Table 3.2 are estimates based on the emissions factors provided by Solar multiplied by the control efficiency expected from the installation of the SCR (approximately 44% NO_x control) and oxidation catalyst (approximately 50% VOC control and 80% CO control).

Potential turbine emissions also include conservatively assumed uncontrolled potential emissions from start-up and shutdown events calculated using emission data provided by Solar. Although these emissions are proved as uncontrolled for the purposes of potential to emit estimations, ACP, LLC expects that some control may be achieved by the combustion turbine control devices during the start-up and shutdown events. Ton per year potential emission estimates are based on an assumed count of 100 start-up and 100 shutdown events per year. The duration of each start-up and shutdown is expected to be approximately 10 minutes per event. Thus, it is assumed that there will be approximately 33.3 hours of start-up and shutdown event time when the unit may not be operating in SoLoNO_x mode. Table 3 of Solar PIL 170 was used as basis for emissions during these events.

A summary of the potential emissions during start-up and shutdown events is presented in Tables 3.3 and 3.4.

To practically track these events and associated emissions, ACP, LLC proposes to keep track of the total number of hours of non-SoLoNO_x mode (a parameter monitored by the turbine control logic) and utilize an average start-up / shutdown emission rate (equivalent lb/hr based on 10 minutes per event). The proposed compliance demonstration is provided in Section 6 of this report.

TABLE 3.3 TURBINE POTENTIAL EMISSIONS DURING START-UP EVENTS

Pollutant	CT-01		CT-02		CT-03		CT-04	
	Solar Titan 130 Turbine		Solar Mars 100 Turbine		Solar Taurus 70 Turbine		Solar Taurus 60 Turbine	
	lb/event	tpy	lb/event	tpy	lb/event	tpy	lb/event	tpy
NO _x	1.9	0.095	1.4	0.070	0.8	0.040	0.7	0.035
CO	177	8.85	123.5	6.18	73.1	3.66	64.3	3.22
VOC	2.02	0.10	1.42	0.071	0.84	0.042	0.74	0.037
CO ₂	1161	58.1	829	41.5	519	26.0	410	20.5
CH ₄	8.08	0.40	5.68	0.284	3.36	0.168	2.96	0.148
CO _{2e}	1363	68.2	971	48.6	603	30.2	484	24.2

TABLE 3.4 PROPOSED TURBINE POTENTIAL EMISSIONS DURING SHUTDOWN EVENTS

Pollutant	CT-01		CT-02		CT-03		CT-04	
	Solar Titan 130 Turbine		Solar Mars 100 Turbine		Solar Taurus 70 Turbine		Solar Taurus 60 Turbine	
	lb/event	tpy	lb/event	tpy	lb/event	tpy	lb/event	tpy
NO _x	2.40	0.120	1.7	0.085	1.1	0.055	0.4	0.020
CO	208	10.4	149.2	7.46	93.4	4.67	33.0	1.65
VOC	2.38	0.119	1.70	0.085	1.06	0.053	0.380	0.019
CO ₂	1272	63.6	920	46.0	575	28.8	204	10.2
CH ₄	9.52	0.476	6.80	0.340	4.24	0.212	1.52	0.076
CO _{2e}	1510	75.5	1,090	54.5	681	34.1	242	12.1

Table 3.5 includes the facility's potential emissions for the combustion turbines including normal continuous operation controlled by SoLoNO_x mode, SCR, and oxidation catalyst, low temperature operation controlled by the SCR and oxidation catalyst as well, as the uncontrolled emissions associated with start-up and shutdown events.

TABLE 3.5 TURBINE POTENTIAL EMISSIONS

Pollutant	CT-01	CT-02	CT-03	CT-04
	Solar Titan	Solar Mars	Solar Taurus	Solar Taurus
	130 Turbine	100 Turbine	70 Turbine	60 Turbine
	tpy	tpy	tpy	tpy
NO _x	15.0	12.3	8.35	6.28
CO	27.8	20.7	13.1	8.46
VOC	1.43	1.14	0.775	0.561
SO ₂	2.58	2.12	1.43	1.08
PM _{FHt}	4.36	3.60	2.42	1.83
PM _{10-FHt}	4.36	3.60	2.42	1.83
PM _{2.5-FHt}	4.36	3.60	2.42	1.83

PM _{Cond}	10.8	8.90	5.99	4.53
CO ₂	90,196	74,385	50,035	37,843
CH ₄	7.40	6.00	4.00	2.96
N ₂ O	2.27	1.87	1.26	0.954
CO ₂ e	91,059	75,094	50,511	38,201
NH ₃	10.2	8.12	5.77	4.29
Total HAP	0.962	0.785	0.525	0.410
Formaldehyde	0.908	0.742	0.496	0.387

3.2 EMERGENCY GENERATOR

Emissions for the natural gas fired emergency generator assume 100 hours of operation per year and are calculated using vendor specifications and EPA's AP-42 emission factors. A summary of the emissions associated with the emergency generator are provided in Table 3.6.

TABLE 3.6 EMERGENCY GENERATOR POTENTIAL EMISSIONS

Pollutant	EG-01 Caterpillar 3516C tpy
NO _x	0.116
CO	0.451
VOC	0.123
SO ₂	0.0004
PM _{Filt}	0.0279
PM _{10-Filt}	0.0279
PM _{2.5-Filt}	0.0279
PM _{Cond}	0.007
CO ₂	103
CH ₄	1.03
CO ₂ e	129
Total HAP	0.0213
Formaldehyde	0.0147

3.3 BOILER

The proposed natural gas boiler will be used to provide building heat (space heating) only, and will have a maximum heat input capacity of 10.7 MMBtu/hr. The boiler will use Low NO_x Burners (LNB). Emissions for the proposed natural gas-fired Boiler are calculated using EPA's AP-42 emission factors for

Natural Gas Combustion (Section 1.4) conservatively assuming 8,760 hours per year.

The potential emissions from the boiler are provided in Table 3.7.

TABLE 3.7 BOILER POTENTIAL EMISSIONS

Pollutant	WH-01
	Boiler tpy
NO _x	2.30
CO	3.86
VOC	0.253
SO ₂	0.0276
PM _{Filt}	0.0873
PM _{10-Filt}	0.0873
PM _{2.5-Filt}	0.0873
PM _{Cond}	0.262
CO ₂	5,514
CH ₄	0.106
N ₂ O	0.101
CO ₂ e	5546
Total HAP	0.0868
Formaldehyde	0.003
Hexane	0.0827

3.4 FUGITIVE EMISSIONS

The proposed project will include fugitive components including valves, flanges, pumps, etc. Emission factors for fugitive components were based on EPA's report on equipment leaks for oil and gas production facilitiesⁱ. It is expected that this facility will comply with recently proposed New Source Performance Standard Subpart OOOOa which incorporates leak detection monitoring. However, no credit for any reduced emissions has been taken in the numbers below.

Additionally, ACP, LLC has estimated emissions from blowdown events. ACP, LLC will minimize these events whenever possible, but blowdown of the

ⁱ USEPA, 1995. "Emission factors from Protocol for Equipment Leak Emission Estimates," EPA-453/R-95-017 Table 2.4, Oil and Gas Production Operations Average Emission Factors.

machines and piping will sometimes occur for safety reasons and to ensure protection of equipment. ACP, LLC has also conservatively included estimated emissions from one site-wide blowdown event in these emission calculations. Such events are not routine, but typically occur once every five years.

The total fugitive emissions are summarized in Table 3.8.

TABLE 3.8 POTENTIAL EMISSIONS ASSOCIATED WITH FUGITIVE COMPONENTS

Pollutant	FUG-01	FUG-02
	Fugitive Leaks - Blowdowns	Fugitive Leaks - Piping
	tpy	tpy
VOC	24.7	26.8
CO ₂	25.6	27.7
CH ₄	844	913
CO ₂ e	21,124	22,856
Total HAP	1.40	1.51

3.5

STORAGE TANKS

The Marts Compressor Station will operate three (3) aboveground storage tanks (ASTs). TK-1 (Accumulator Storage Tank) will have a capacity of 2,500 gallons and will receive and store pipeline liquids captured by the station's separators and filter-separators. The emissions associated with the operation of this accumulator storage tank are estimated using E&P Tanks to ensure capture of any flash emissions (which the EPA TANKS program cannot estimate). ACP, LLC has estimated that this storage tank will complete five (5) turnovers per year.

TK-2 (Hydrocarbon Waste Tank) will have a capacity of 2,000 gallons and will receive liquids from the compressor building and auxiliary building floor drains. The emissions associated with the operation of this hydrocarbon waste tank were calculated using EPA's TANKS program. ACP, LLC has estimated that this storage tank will complete five (5) turnovers per year.

The potential VOC emissions associated with the proposed new storage tanks are 0.35 tpy (0.08 lb/hr).

TK-3 (Aqueous Ammonia Storage Tank) will have a capacity of 8,000 gallons and will be used to supply aqueous ammonia to SCRs.

3.6

TANK UNLOADING OPERATIONS

The Marts Compressor Station will occasionally require tank unloading operations for the unloading of the on-site ASTs. Emissions from tank unloading operations have been calculated using AP-42 Section 4.2, Transportation and Marketing of Petroleum Liquids. The potential VOC emissions associated with the proposed loading rack are 0.006 tpy (5.25 lb/hr).

3.7

PROJECT EMISSIONS

The potential emissions associated with the proposed new equipment at the Marts Compressor Station are summarized in Table 3.9 in tons per year. Detailed emission calculations are provided in Appendix A (see Attachment N) of this document.

TABLE 3.9 FACILITY-WIDE POTENTIAL EMISSIONS (TPY)

Unit ID	Criteria Pollutants										Greenhouse Gases					Ammonia NH ₃	Total HAP
	NO _x	CO	VOC	SO ₂	PM _{10-Fit}	PM _{2.5-Fit}	PM _{10-Cond}	CO ₂	CH ₄	N ₂ O	CO _{2e}						
CT-01	15.0	27.8	1.43	2.58	4.36	4.36	10.8	90,196	7.40	2.27	91,059	10.2	0.962				
CT-02	12.3	20.7	1.14	2.12	3.60	3.60	8.90	74,385	6.00	1.87	75,094	8.12	0.785				
CT-03	8.35	13.1	0.775	1.43	2.42	2.42	5.99	50,035	4.00	1.26	50,511	5.77	0.525				
CT-04	6.28	8.46	0.561	1.08	1.83	1.83	4.53	37,843	2.96	0.954	38,201	4.29	0.410				
EG-01	0.116	0.451	0.123	0.0004	0.0279	0.0279	0.007	103	1.03	0.00	129	0.00	0.0213				
WH-01	2.30	3.86	0.253	0.0276	0.0873	0.0873	0.262	5,514	0.106	0.101	5,546	0.00	0.0868				
FUG-01	-	-	24.7	-	-	-	-	25.6	844	-	21,124	-	1.40				
FUG-02	-	-	26.8	-	-	-	-	27.7	913	-	22,856	-	1.51				
TK-1	-	-	0.350	-	-	-	-	-	-	-	-	-	-				
TK-2	-	-	1.76E-05	-	-	-	-	-	-	-	-	-	-				
IR-01	-	-	0.006	-	-	-	-	-	-	-	-	-	-				
Total	44.4	74.4	56.1	7.24	12.3	12.3	30.5	258,130	1,779	6.46	304,519	28.4	5.70				

4.0 FEDERAL REGULATORY REQUIREMENTS

4.1 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

NSPS have been established by the EPA to limit air pollutant emissions from certain categories of new and modified stationary sources. The NSPS regulations are contained in 40 CFR Part 60 and cover many different source categories, and applicable categories are described below.

4.1.1 40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Subpart Dc applies to steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design heat capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. The 10.7 MMBtu/hr boiler will be subject to this regulation. To demonstrate compliance with this rule, these sites will maintain and report fuel records certifying the fuel is in compliance with the NSPS Dc standards for SO₂.

4.1.2 40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels

This regulation applies to volatile organic liquid storage vessels with storage capacities greater than or equal to 75 cubic meters (19,812 gallons) for which construction, reconstruction, or modification commenced after July 23, 1984. There are no petroleum storage vessels with capacities greater than 19,812 gallons planned at the Marts Compressor Station, and this regulation is therefore not applicable to the facility.

4.1.3 40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

NSPS Subpart JJJJ was promulgated on Jan 8, 2008 and is applicable to new stationary spark ignition internal combustion engines depending upon model year and size category. The new emergency generator is subject to the NO_x, CO and VOC requirements of this subpart and will comply with the emission standards under this subpart.

4.1.4

40 CFR 60 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

NSPS 40 CFR Part 60 Subpart KKKK regulates stationary combustion turbines with a heat input rating of 10 MMBtu/hr or greater that commence construction, modification, or reconstruction after February 18, 2005. Subpart KKKK limits emissions of NO_x as well as the sulfur content of fuel that is combusted from subject units.

The proposed Solar combustion turbines will be subject to the requirements of this subpart. Subpart KKKK specifies several subcategories of turbines, each with different NO_x emissions limitations. The proposed turbines fall within the “medium sized” (> 50MMBtu/hr, < 850 MMBtu/hr) category for natural gas turbines. “Medium sized” turbines must meet a NO_x limitation of 25 parts per million by volume (ppmv) at 15 percent oxygen (O₂), and “small sized, mechanical drive” turbines must meet a NO_x limitation of 100 ppmv at 15 percent O₂ under the requirements of Subpart KKKK and units must minimize emissions consistent with good air pollution control practices during startup, shutdown and malfunction.

Solar provides an emissions guarantee of 9 parts per million volume dry (ppmvd) NO_x at 15 percent O₂ for the proposed SoLoNO_x equipped units. These guarantees apply at all times except during periods of start-up and shutdown and periods with ambient temperatures below 0°F. In addition, SCR will be installed to lower emissions for all turbines to further reduce NO_x emissions to 5 ppmvd at 15 % O₂, except during periods of start-up and shutdown and periods with ambient temperatures below 0°F.

ACP, LLC plans to conduct stack tests for NO_x emissions to demonstrate compliance with the Subpart KKKK emissions limits.

The NSPS Subpart KKKK emission standard for SO₂ is the same for all turbines, regardless of size and fuel type. All new turbines are required to meet an emission limit of 110 nanogram per joule (ng/J) (0.90 pounds [lbs]/megawatt-hr) or a sulfur limit for the fuel combusted of 0.06 lbs/MMBtu. The utilization of natural gas as fuel ensures compliance with the SO₂ standard due to the low sulfur content of natural gas.

4.1.5

40 CFR 60 Subparts OOOO and OOOOa – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

Subpart OOOO currently applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. Subpart OOOO establishes emissions standards and compliance schedules for the control of VOCs and SO₂ emissions for affected facilities producing, transmitting, or distributing natural gas. Compressors located between the

wellhead and the point of custody transfer to the natural gas transmission and storage segment are subject to this Subpart. Custody transfer is defined as the transfer of natural gas after processing and/or treatment in the producing operations. All proposed equipment will be located after the point of custody transfer, and therefore centrifugal compressors driven by the proposed turbines are not currently subject to this regulation. Storage vessels located in the natural gas transmission and storage segment that have the potential for VOC emissions equal to or greater than 6 tpy are also subject to this Subpart. All storage vessels to be located at compressor stations will emit less than this threshold, and thus will not be subject to this regulation.

On August 18, 2015, EPA proposed amendments to 40 CFR 60, Subpart OOOO and proposed an entirely new Subpart OOOOa. If finalized, revisions proposed for Subpart OOOO would apply to oil and natural gas production, transmission, and distribution affected facilities that were constructed, reconstructed, and modified between August 23, 2011 and the Federal Register publication date (anticipated September 2015). Conversely, if finalized, Subpart OOOOa will apply to oil and natural gas production, transmission, and distribution affected facilities that are constructed, reconstructed, and modified after the Federal Register date. The proposed NSPS Subpart OOOOa would establish standards for both VOC and methane.

Based on the expected date of publication in the Federal Register, it is anticipated this project will be required to comply with the requirements of NSPS Subpart OOOOa. There is uncertainty if Subpart OOOOa will become final or what the final requirements will specifically include; however, the proposal contains provisions that would affect additional sources at the proposed facilities beyond Subpart OOOO. While storage tanks remain covered, Subpart OOOOa also includes provisions intended to reduce emissions from centrifugal compressors and equipment leaks from transmission and storage facilities. For centrifugal compressors, Subpart OOOOa proposes the use of dry seals or the control of emissions if wet seals are used. Dry seals are already planned for use in all proposed compressors. For equipment leaks, Subpart OOOOa proposes requiring periodic surveys using optical gas imaging (OGI) technology and subsequent repair of any identified leaks. The project will comply with all applicable leak detection provisions of proposed Subpart OOOOa.

4.2

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

NESHAP regulations established in 40 CFR Part 61 and Part 63 regulate emission of air toxics. NESHAP standards primarily apply to major sources of Hazardous Air Pollutants (HAPs), though some Subparts of Part 63 have been revised to include area (non-major) sources. The NESHAP regulations under 40 CFR Part 61

establish emission standards on the pollutant basis whereas 40 CFR Part 63 establishes the standards on a source category basis. The Marts Compressor Station will not emit any single HAP in excess of 10 tpy and will not emit combined HAPS in excess of 25 tpy, and will therefore be designated as an area source of HAPs.

4.2.1 ***40 CFR 63 Subpart HHH - National Emissions Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities***

This regulation applies to certain affected facilities at major HAP sources. The Marts Compressor Station will be an area HAP source. Therefore, this regulation is not applicable.

4.2.2 ***40 CFR 63 Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers And Process Heaters***

Industrial, commercial, or institutional boilers or process heaters located at a major source of HAPs are subject to this Subpart. The Marts Compressor Station will not be a major source of HAPs, and therefore will not be subject to this Subpart.

4.2.3 ***40 CFR 63 Subpart JJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources***

This Subpart applies to area sources of HAPs. The Marts Compressor Station will be an area source of HAPs; however, gas-fired boilers as defined by this Subpart are not subject to any requirements under this rule. As such, this subpart does not apply.

4.2.4 ***40 CFR 63 Subpart YYYY - National Emissions Standards for Hazardous Air Pollutants for Stationary Combustion Turbines***

Stationary combustion turbines located at major sources of HAP emissions are subject to this Subpart. The Marts Compressor Station will be an area HAP source. Therefore, this regulation is not applicable.

4.2.5 ***40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines***

The emergency generator is subject to the NESHAP requirements under 40 CFR Part 63 Subpart ZZZZ (and applies to both major and area sources of HAPs). However, the NESHAP refers to the NSPS Subpart JJJJ for all applicable requirements. Therefore, compliance with the NSPS Subpart JJJJ requirements ensures compliance with the NESHAP requirements.

4.3

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AND NON-ATTAINMENT NEW SOURCE REVIEW

The West Virginia State Regulations address federal regulations where the state of West Virginia has been delegated enforcement authority, including Prevention of Significant Deterioration (PSD) permitting

The Marts Compressor Station will be located in Lewis County. The air quality of Lewis County is designated by the U.S. EPA as either "better than normal standards" or "unclassified/attainment" for all criteria pollutants (40 CFR 81.318). As such, new construction or modifications that result in emission increases are potentially subject to the PSD permitting regulations.

PSD applicability depends on the existing status of a facility (i.e. major or minor source) and the net emissions increase associated with the project. The major source threshold for PSD applicability for a new facility is 250 tons per year (tpy) unless the source is included on a list of 28 specifically defined industrial source categories for which the PSD "major" source threshold is 100 tpy. Since the Marts Compressor Station is not one of the 28 listed sources, the PSD major source threshold is 250 tpy of a criteria pollutant regulated by the Clean Air Act (CAA). Potential emissions of each criteria pollutant from the proposed facility will not exceed 250 tpy, as shown in Section 3. Therefore, the facility and project are not subject to PSD review.

4.4

TITLE V OPERATING PERMIT

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the Station is not a major source for Title V purposes.

4.5

MAINTENANCE EMISSIONS AND FEDERAL ROUTINE MAINTENANCE, REPAIR AND REPLACEMENT PROVISIONS (RMRR)

As part of normal operations of the Marts Compressor Station, ACP, LLC will routinely conduct activities associated with maintenance and repair of the facility equipment. These maintenance and repair activities will include, but will not be limited to, compressor engine startup/shutdowns, calibrating equipment, changing orifice plates, deadweight testing, emergency power

generator run times, changing equipment filters (e.g., oil filters, separator filters), compressor engine and auxiliary equipment inspection and testing, and use of portable gas/diesel engines for air compressors and lube guns.

Furthermore, in order to ensure the reliability of natural gas deliveries to their customers, ACP, LLC may conduct equipment and component replacement activities that conform to the currently applicable federal laws and regulations.

4.6 CHEMICAL ACCIDENT PREVENTION AND RISK MANAGEMENT PROGRAMS (RMP)

The Marts Compressor Station will not be subject to the Chemical Accident Prevention Provisions (40 CFR 68.1), as no chemicals subject to regulation under this Subpart will be present onsite. The aqueous ammonia stored on site will have a concentration of less than 20%.

4.7 ACID RAIN REGULATIONS

The Marts Compressor Station will not sell electricity and is a non-utility facility. Therefore, the facility will not be subject to the federal acid rain regulations found at 40 CFR Parts 72 through 77.

4.8 STRATOSPHERIC OZONE PROTECTION REGULATIONS

Subpart F, Recycling and Emissions Reductions, of 40 CFR Part 82, Protection of Stratospheric Ozone, generally requires that all repairs, service, and disposal of appliances containing Class I or Class II ozone depleting substances be conducted by properly certified technicians. The facility will comply with this regulation as applicable.

4.9 GREENHOUSE GAS REPORTING

On November 8, 2010, the USEPA finalized GHG reporting requirements under 40 CFR Part 98. Subpart W of 40 CFR Part 98 requires petroleum and natural gas facilities with actual annual GHG emissions equal to or greater than 25,000 metric tons CO₂e to report GHG from various processes within the facility. Following this project, the Marts Compressor Station is expected to be subject to GHG emissions reporting. If the emissions threshold is met or exceeded, ACP, LLC will comply with the applicable GHG reporting requirements.

STATE REGULATORY APPLICABILITY

This section outlines the State air quality regulations that could be reasonably expected to apply to the Marts Compressor Station and makes an applicability determination for each regulation based on activities planned at the Station and the emissions of regulated air pollutants associated with this project. This review is presented to supplement and/or add clarification to the information provided in the WVDEP Rule 13 permit application forms.

The West Virginia State Regulations address federal regulations where West Virginia has been delegated authority of enforcement, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. The regulatory requirements in reference to the Marts Compressor Station are described in detail in Table 5-1.

TABLE 5.1 STATE REGULATORY APPLICABILITY

Regulatory Applicability	Applicable Requirement	Compliance Approach
Particulate Emissions (45 CSR 02)	The proposed project includes one (1) indirect heat exchanger (WH-1) rated at 10.7 MMBtu/hr that combusts natural gas.	ACP, LLC will comply with this Rule by operating the equipment with visible emissions less than 10% opacity.
Objectionable Odors (45 CSR 04)	Prevent the discharge of air pollutants that contribute to objectionable odors	Operations conducted at the compressor station are subject to this requirement. The facility is staffed and will use best practices to minimize odors.
Sulfur Oxides (45 CSR 10)	All fuel burning units will be subject to the weight emission standard for sulfur dioxide.	Compliance with this limit will be demonstrated by combustion pipeline quality natural gas and maintenance of a copy of the FERC Tariff Sheet.
Stationary Source Permitting (45 CSR 13)	A permit application is required to be submitted for the authority to construct and operate emission sources.	This permit application is being submitted for the authority to construct and operate the Marts Compressor Station.
Construction and Major Modification of Major Sources for the Prevention of Significant Deterioration (45 CSR 14)	Operation of equipment at this Marts Compressor Station will not exceed the PSD emission triggers.	See Section 4.0.
New Source Performance Standards (45 CSR 16)	The Station is required to comply with applicable NSPS Standards.	See Section 4.1

Regulatory Applicability	Applicable Requirement	Compliance Approach
Construction and Major Modification of Major Source Causing or Contributing to Nonattainment (45 CSR 19)	Lewis County, WV is in attainment for all pollutants with a National Ambient Air Quality Standard (NAAQS). Therefore, this regulation does not apply to the Marts Compressor Station.	NA
Hazardous Waste (45 CSR 25)	This Station does not qualify as a waste treatment, storage, and disposal facility and no hazardous waste will be burned at this Site; therefore, it is not subject to this hazardous waste rule.	NA
Title V Operating Permits (45 CSR 30)	The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility after the proposed project. Therefore, the Station is not a major source for Title V purposes.	See Section 4.4
NESHAP Rules (45 CSR 34)	The Station is required to comply with applicable NESHAP Rules.	See Section 4.2
Control of Annual Nitrogen Oxide Emissions (45 CSR 39)	The Station will operate fossil-fuel fired combustion turbines; however, these turbines will not be used for the production of electricity and are therefore exempt from this Rule.	NA
Control of Ozone Season Nitrogen Oxide Emissions (45 CSR 40)	Turbines will not be used for the production of electricity and are therefore exempt from this Rule.	NA
Control of Annual Sulfur Dioxide Emissions (45 CSR 41)	Turbines will not be used for the production of electricity and are therefore exempt from this Rule.	NA

PROPOSED COMPLIANCE DEMONSTRATIONS

The following methods are proposed for demonstrating ongoing compliance for the sources described in this application:

Compressor Turbines (CT-01 through CT-04)**NO_x**

Annual stack testing (or semi-annual testing as allowed) will be completed to demonstrate compliance with the NSPS Subpart KKKK emissions limits (NO₂ emissions).

Compliance with the combustion turbines potential to emit will be demonstrated on a 12-month rolling total basis by the sum of the following emissions:

- Normal Operation: The average emission rate from the most recent stack test (lb/hour) times the number of hours operating in SoLoNO_x mode (mode indication provided and recorded by control logic on turbine).
- Low Temperature (< 0° F) Operation: The proposed controlled emission rates (lb/hr, see Table 3.2) determined using the Solar provided emissions factor multiplied by the control efficiency of the SCR times the number of hours when inlet combustion air for turbine was measured to be below 0 degrees F.
- Startup and Shutdown Emissions (< 50% load): The Solar-provided emission rates (see Tables 3.3 and 3.4) divided by Solar-assumed duration for startups and shutdowns (1/6 of an hour each) times the number of hours operating in non-SoLoNO_x mode (mode indication provided and recorded by control logic on the turbine).

CO, VOC, PM₁₀/PM_{2.5}:

Initial stack testing will be completed to determine PM₁₀/PM_{2.5} emission rates (lb/MMBtu). Fuel firing will be tracked and used to calculate annual (rolling 12-month total) ton per year emissions.

Initial stack testing will be competed to determine VOC and CO emission rates. Compliance with the combustion turbines potential to emit will be demonstrated on a 12-month rolling total basis by the sum of the following emissions:

- Normal Operation: The average emission rate from the most recent stack test (lb/hour) times the number of hours operating in SoLoNO_x mode (mode indication provided and recorded by control logic on turbine).
- Low Temperature (< 0° F) Operation: The proposed controlled emission rates (lb/hr, see Table 3.2) determined using the Solar provided emissions factor multiplied by the control efficiency of the oxidation catalyst times the number of hours when inlet combustion air for turbine was measured to be below 0 degrees F.
- Startup and Shutdown Emissions (< 50% load): The Solar-provided emission rates (see Tables 3.3 and 3.4) divided by Solar-assumed duration for startups and shutdowns (1/6 of an hour each) times the number of hours operating in non-SoLoNO_x mode (mode indication provided and recorded by control logic on the turbine).

GHG:

Total annual fuel volume will be tracked to determine total MMBtu of firing. This value times the EPA Mandatory Reporting Rule natural gas emission factor (40 CFR Part 98 Subpart C) times the Global Warming Potential (40 CFR Part 98 Subpart A) will be used to calculate ton per year CO₂e emissions.

Boiler (WH-01)

The unit will maintain compliance with NSPS Subpart Dc (maintain records of fuel fired daily and sulfur content of gas).

Emergency Generator

Records of the monthly emergency and non-emergency use will be maintained to confirm compliance with the annual limit for non-emergency operation. If a non-certified engine is installed or if a certified engine is installed but operated as non-certified an initial stack test and testing every 8760 operating hours or three years (whichever comes first) will be conducted.

Other Combustion Sources

If not otherwise specified above, the amount of fuel fired in units and/or hours of operation will be tracked and multiplied by the appropriate emission factor to calculate emissions on an annual basis.

APPENDICES

APPENDIX A

WVDAQ AIR PERMIT APPLICATION FORMS

x

x



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):
Atlantic Coast Pipeline, LLC.

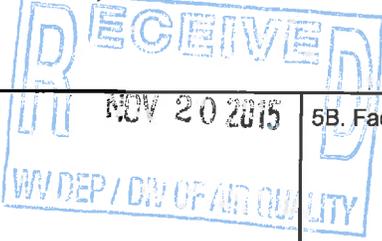
2. Federal Employer ID No. (FEIN):
47 - 1813950

3. Name of facility (if different from above):
Marts Compressor Station

4. The applicant is the:
 OWNER OPERATOR BOTH

5A. Applicant's mailing address:
**707 Main St.
Richmond, VA 23219**

5B. Facility's present physical address:



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:

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: **The applicant is the owner of the site.**
 - 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 Transmission Facility

10. North American Industry Classification System (NAICS) code for the facility:
486210

11A. DAQ Plant ID No. (for existing facilities only):	11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):	
<i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i>		
12A. <ul style="list-style-type: none"> - For Modifications, Administrative Updates or Temporary permits at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; - For Construction or Relocation permits, please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a MAP as Attachment B. <p style="margin-left: 40px;">Traveling along US-19 S from West Milford, WV turn right onto Gooseman Rd. Turn left onto Kincheloe Run Road and then after 0.15 miles take a right onto Hollick Run Road. Take the next right and continue up a dirt road until you reach Marts Compressor Station.</p>		
12.B. New site address (if applicable): N/A	12C. Nearest city or town: West Milford	12D. County: Lewis
12.E. UTM Northing (KM): 4,332.66	12F. UTM Easting (KM): 545.53	12G. UTM Zone: 17
13. Briefly describe the proposed change(s) at the facility: Construction of a Natural Gas Transmission Station		
14A. Provide the date of anticipated installation or change: - If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: N/A		14B. Date of anticipated Start-Up if a permit is granted: 2018
14C. Provide a Schedule of the planned Installation of/Change to and Start-Up of each of the units proposed in this permit application as Attachment C (if more than one unit is involved).		
15. Provide maximum projected Operating Schedule of activity/activities outlined in this application: Hours Per Day 24 Days Per Week 7 Weeks Per Year 52		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
17. Risk Management Plans. If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your Risk Management Plan (RMP) to U. S. EPA Region III.		
18. Regulatory Discussion. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<i>if known</i>). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (<i>if known</i>). Provide this information as Attachment D .		
Section II. Additional attachments and supporting documents.		
19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).		
20. Include a Table of Contents as the first page of your application package.		
21. Provide a Plot Plan , e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E (Refer to Plot Plan Guidance). - 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:

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

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

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

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

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

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

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

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

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

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

YES NO

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

Section III. Certification of Information

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

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

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

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

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

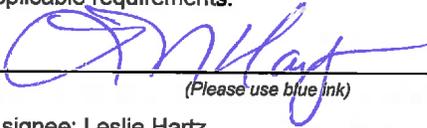
Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE _____


(Please use blue ink)

DATE: _____

11/19/15
(Please use blue ink)

35B. Printed name of signee: Leslie Hartz

35C. Title: VP, Pipeline Construction

35D. E-mail: leslie.hartz@dom.com

35E. Phone: (804) 771-4460

35F. FAX:

36A. Printed name of contact person (if different from above): William Scarpinato

36B. Title: Manager-Environmental Services

36C. E-mail: William.A.Scarpinato@dom.com

36D. Phone: (804) 273-3019

36E. FAX:



PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

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

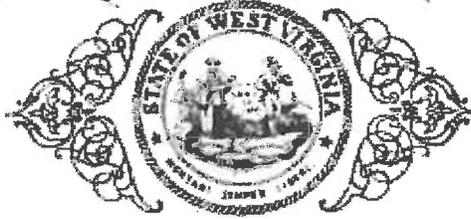
FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

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

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

Attachment A

State of West Virginia



Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

ATLANTIC COAST PIPELINE, LLC

Control Number: 9A7TZ

a limited liability company, organized under the laws of the State of Delaware has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of November 7, 2014, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia



*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
November 7, 2014*

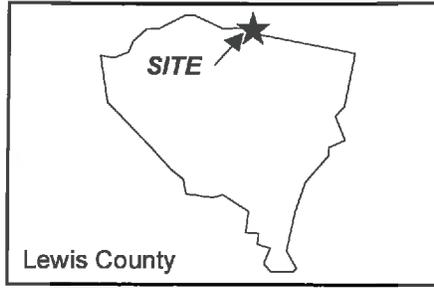
Natalie E. Tennant

Secretary of State

Attachment B



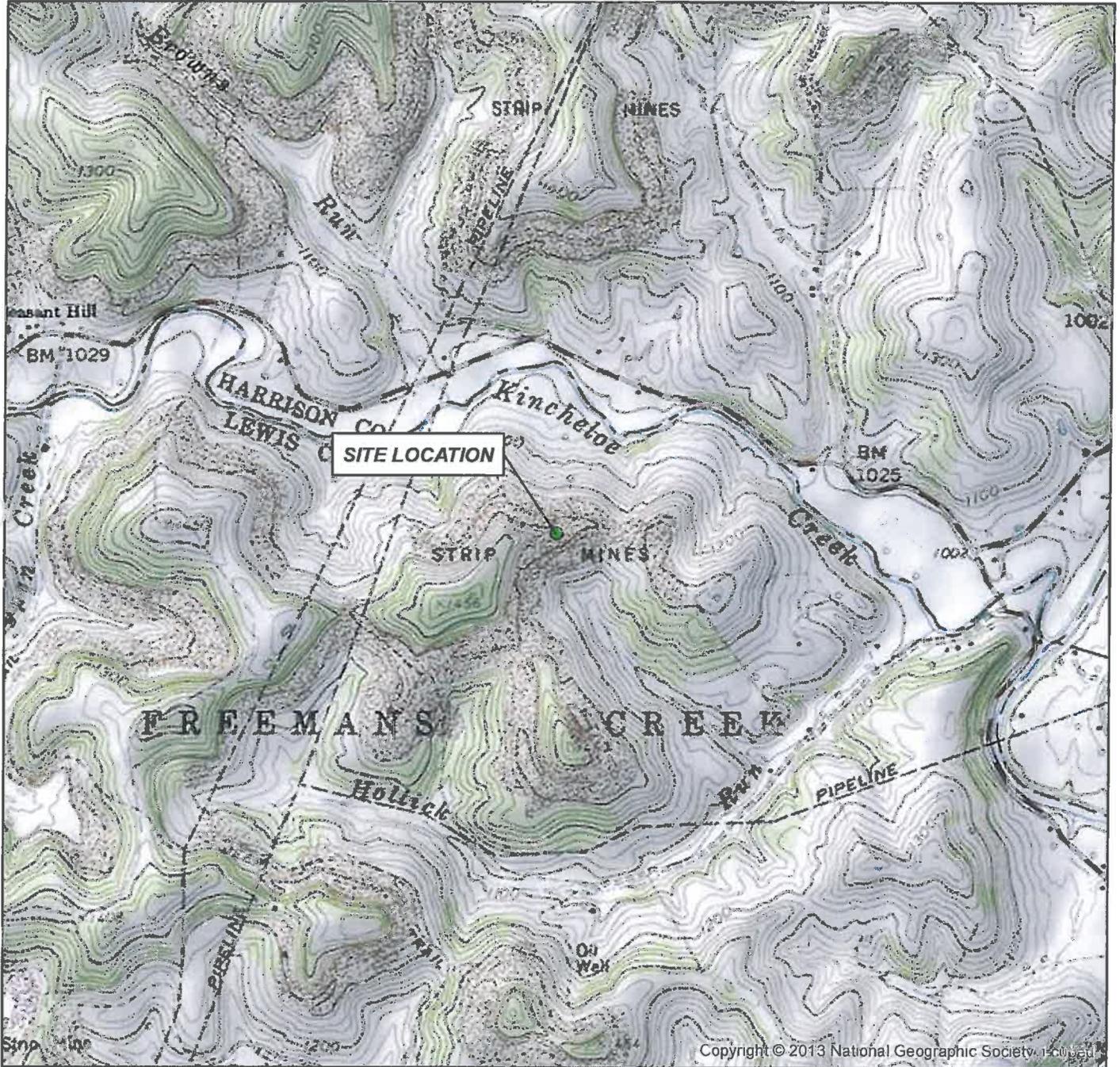
West Virginia



Lewis County



LAT. 39.14190 LON. -80.47318
LEWIS COUNTY
WEST VIRGINIA



Copyright © 2013 National Geographic Society. All rights reserved.

USGS 1:24K 7.5' Quadrangle: West Milford, WV

SITE LOCATION MAP

Atlantic Coastal Pipeline Project

Marts Compressor Station
Atlantic Coastal Pipeline, LLC
Lewis County, West Virginia

GIS Review: GM

CHK'D: GM

0272413



Drawn By:
SRV 7/15/15

Environmental Resources Management

ATTACHMENT B

Attachment C

Attachment C

Schedule of Installation

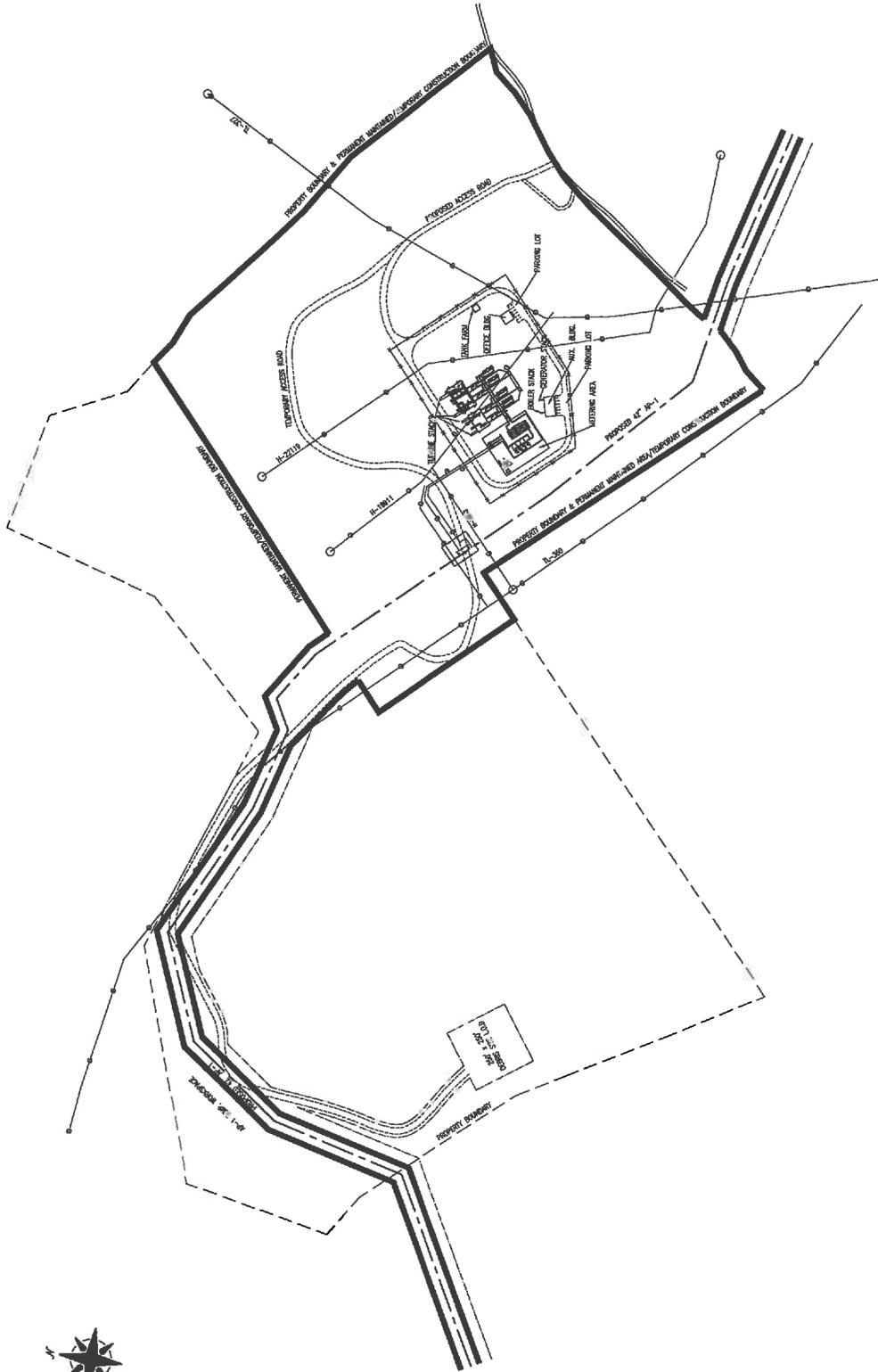
The ACP 1 Station is scheduled to commence construction in April 2017. The anticipated start-up date is November 2018.

Attachment D

Attachment D - Regulatory Discussion

A state and federal regulatory discussion has been included in the narrative preceding the WVDAQ Permit Application Forms.

Attachment E



SITE LOCATION
 LAT: 38°08'18.94"
 LONG: 80°27'41.54"
 MILE POST: 7.33 I-77

GENERAL NOTES AND COMMENTS:
ISSUED FOR REVIEW
 7/7/15
 SCALE: 1" = 200'

LEGEND

—	PROPOSED LAP PIPELINE
---	TEMPORARY CONSTRUCTION DISTURBANCE
---	TEMPORARY MAINTENANCE AREA
---	PROPERTY BOUNDARY
---	FENCE (PROPOSED)
---	EXISTING PIPELINE

SYMBOL	DATE	BY
△	7/7/15	RE
△	4/27/15	RE
△	4/27/15	AVC
△	4/27/15	AVC
△	12/2/14	JAB

REVISION INFORMATION

NO.	DATE	DESCRIPTION
1	7/7/15	ISSUED FOR REVIEW
2	4/27/15	ISSUED FOR REVIEW
3	4/27/15	ISSUED FOR REVIEW
4	4/27/15	ISSUED FOR REVIEW
5	12/2/14	ISSUED FOR REVIEW

PROJ. NO.	DATE	BY
150714	12/2/14	JAB
150715	12/2/14	JAB

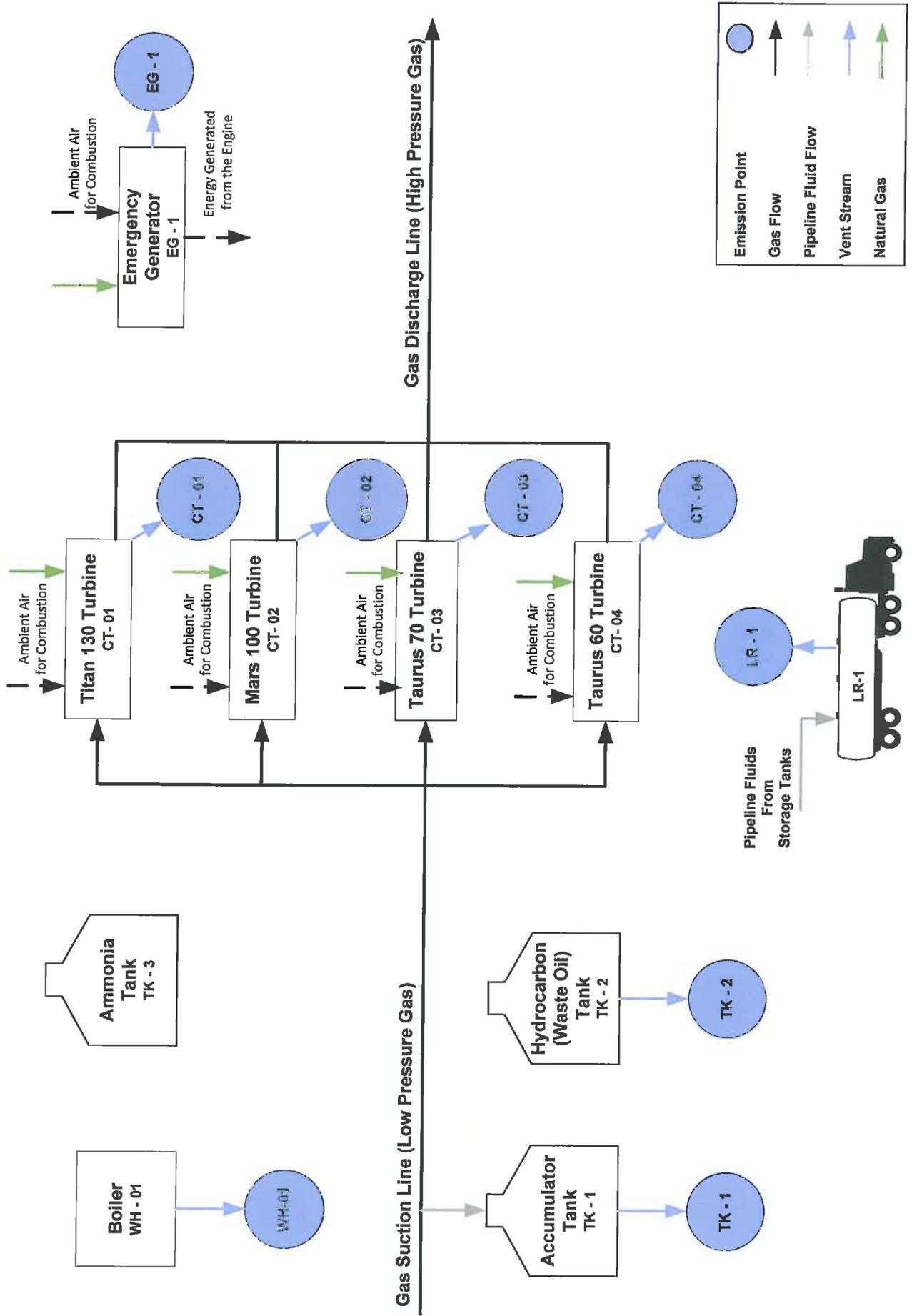
REV.	DATE	DESCRIPTION
1	12/2/14	JAB
2	12/2/14	JAB

Atlantic Coast Pipeline, LLC
 445 West Main St. Chesapeake, West Virginia 25801 / Phone: (804) 625-0000
M&R/COMPRESSOR STATION
PRELIMINARY SITE PLAN
 DRAWN BY: JAB
 CHECKED BY: JAB
 DATE: 12/2/14
 SCALE: 1" = 200'

NO. 2079A H

Attachment F

Attachment F – Detailed Process Flow Diagram Atlantic Coast Pipeline, LLC. – Marts Compressor Station



Attachment G

Attachment G

Process Description

Atlantic Coast Pipeline, LLC. is submitting this Rule 13 Permit Application for the Marts Compressor Station to comply with the permitting requirements of the state of West Virginia. Natural gas from the transmission pipeline is routed through this transmission station. The natural gas fueled internal combustion engines CT-01, CT-02, CT-03, and CT-4 provide the compression required for the transmission of natural gas along the Atlantic Coast Pipeline. The engines manufactured by Solar Turbines include a Titan 130-20502S, Mars 100-16000S, Taurus 70-10802S, and Taurus 60-7800S. The Marts Compressor Station will require an emergency generator (Caterpillar G3516C) with a capacity of 2,098 hp to provide backup power during emergency situations. A 10.7 MMBtu/hr boiler (WH-01) will be installed to provide process heat. Produced liquids are temporarily stored in the accumulator tank (TK - 1) until they can be removed off-site by the tank truck (LR-1). A hydrocarbon (waste oil) tank (TK-2), is also proposed to be at the Marts Compressor Station.

Attachment H

Airgas

Material Safety Data Sheet # 4003

Last Revision 05/20/09

Page 1 of 2

SECTION 1: CHEMICAL PRODUCT & COMPANY IDENTIFICATION

CHEMICAL NAME: Ammonium Hydroxide **TRADE NAMES / SYNONYMS:** Aqua Ammonia, Ammonium Hydroxide
MANUFACTURER AND/OR DISTRIBUTOR: **EMERGENCY TELEPHONE NUMBERS:**
Airgas Specialty Products Transportation (CHEMTREC): 1-800-424-9300
2530 Sever Road, 300 Environmental/Health/Safety (24-hr): 1-800-528-4963
Lawrenceville, GA 30043 USA Customer Service (Toll Free): 1-800-295-2225

SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL	FORMULA	% BY WEIGHT	CAS	OSHA PEL	NIOSH REL / ACGIH TLV	IDLH
Ammonia	NH ₃	5-19.9	7664-41-7	25 ppm (California only)		
Water	H ₂ O	80.1-95	7732-18-5	50 ppm (TWA)	25 ppm (TWA)	35 ppm (STEL)
Aqua Ammonia	NH ₄ OH	100	1336-21-6	-----	-----	300ppm

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: 1. Colorless liquid with a pungent odor. 2. Avoid contact with liquid and vapor. 3. Not flammable. 4. Mixes with water. 5. Harmful to aquatic life in very low concentrations. 6. Stop discharge if possible.

POTENTIAL HEALTH EFFECT

ROUTES OF ENTRY: Inhalation, Skin Contact, Eye Contact, Ingestion **TARGET ORGANS:** Eyes, skin and respiratory system.
EYE CONTACT: May be severely irritating upon liquid exposure, with irritation from fumes. **SKIN CONTACT:** High concentrations can cause severe irritation and burns. **INHALATION:** The gas can be suffocating and is irritating to the mucous membranes and lung tissue. **INGESTION:** Can cause vomiting, nausea and corrosive burns to the esophagus and stomach. The exact nature and intensity of toxic effects following ingestion of varying amounts of strong aqua ammonia solution (ex. 28%) is unpredictable. The most accepted view is that any amount from one teaspoon or greater can be dangerous if ingested.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush with large amounts of water for at least 15 minutes then immediately seek medical aid.

SKIN CONTACT: Immediately flush with large quantities of water for at least 15 minutes while removing clothing. Seek immediate medical aid.

INHALATION: Remove from exposure. If breathing has stopped or is difficult, administer artificial respiration or oxygen as needed. Seek immediate medical aid.

INGESTION: Do not induce vomiting. Have victim drink large quantities of water if conscious. Immediately seek medical aid. Never give anything by mouth to an unconscious person.

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT (method used): Not Applicable **FLAMMABLE LIMITS:** 16-25% NH₃ in air (for labeling purposes, not DOT flammable gas). **EXTINGUISHING MEDIA:** Water fog or spray for escaping ammonia gas.

SPECIAL FIRE FIGHTING PROCEDURES: The mixture will not burn but escaping gas can burn in the range of 16-25% NH₃ in air. Wear full protective clothing and self-contained breathing apparatus in the pressure demand mode.

NFPA HAZARD CLASSIFICATION (Aqua): Health: 2 Flammability: 1 Reactivity: 0 (least-0 — 4-highest)

SECTION 6: ACCIDENTAL RELEASE MEASURES

In US, federal regulations require that a release of 1,000 lb. or more of ammonium hydroxide must be reported immediately to the National Response Center at (800) 424-8802, the SERC and the LEPC. In California, ALL releases must be reported to CUPA, state and local agencies. Additional state and local regulations may apply. **SUGGESTED LOCAL ACTION:** Releases will liberate irritating vapors. Spilled liquids should be contained and not washed into sewers or ground water. Prevent large quantities from contact with vegetation or waterways. Ammonium hydroxide is a regulated material and reporting of any release may be required. Any release of this material during the course of loading, transporting, unloading or temporary storage must be reported to the U.S. DOT as required by 49 CFR 171.15 and 171.16.

SECTION 7: HANDLING AND STORAGE

Store in ventilated containers or pressure vessels away from heat. Open containers cautiously in case of pressure build up. Zinc, copper and copper alloys such as brass are rapidly corroded by ammonium hydroxide.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Respiratory protection approved by NIOSH / MSHA for ammonia must be used when exposure limits are exceeded. Whether chemical canister respirator or self-contained breathing apparatus is sufficient for effective respiratory protection depends on the type and magnitude of exposure.

SKIN PROTECTION: Rubber gloves and rubber or other types of approved protective clothing should be used to prevent skin contact. A face shield should be used for increased protection from contact with liquid or vapor.

EYE PROTECTION: Chemical splash goggles, approved for use with ammonia, must be worn to prevent eye contact with liquid or vapor. A face shield should be used for increased protection from contact with liquid.

VENTILATION: Local positive pressure and/or exhaust ventilation should be used to reduce vapor concentrations in confined spaces. Ammonia vapor, being lighter than air, can be expected to dissipate to the upper atmosphere. Ammonia concentrations may also be reduced by the use of an appropriate absorbent or reactant material.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 160°F (10% Sol'n.) **SPECIFIC GRAVITY:** 0.928 @ 60°F (19.5% Sol'n., water=1)
SOLUBILITY IN WATER: Complete **VAPOR DENSITY:** 0.60 @ 32°F (Air=1)
MELTING POINT: Approx 15°F (10% Sol'n.) **pH:** Approx. 11.6 for 1 N Sol'n. in water
PERCENT VOLATILE BY VOLUME: 100% **APPEARANCE:** Colorless, pungent liquid
VAPOR PRESSURE: 130 mm Hg @ 80°F(10% Sol'n.)

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Material generally considered stable. Heating above ambient temperature causes the vapor pressure of ammonia to increase rapidly.

INCOMPATIBILITY (materials to avoid): Strong acids. Aqua ammonia reacts with bromine, chlorine, mercury, silver, silver solder, and hypochlorite (bleach) to form explosive compounds. Avoid use of metals containing copper or zinc.

HAZARDOUS DECOMPOSITION PRODUCTS: Heating and contact of vapors with very hot surfaces may form hydrogen. The decomposition temperature may be lowered to 575°F by contact with certain metals such as nickel.

HAZARDOUS POLYMERIZATION: Will not occur **CONDITIONS TO AVOID:** Not applicable

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICITY BY INGESTION: Grade 3; Oral Raf, LD₅₀ = 350 mg/kg. Ammonia is a strong alkali and readily damages all body tissues. Ammonia is not a cumulative metabolic poison.

SECTION 12: ECOLOGICAL INFORMATION

AQUATIC TOXICITY: 6.25 ppm 24hr/Trout/Lethal/Freshwater; 15ppm 48hr/Sunfish/TLm/Tap Water

WATERFOWL TOXICITY: Data not available

BIOCHEMICAL OXYGEN DEMAND: Data not available

FOOD CHAIN CONCENTRATION POTENTIAL: None

SECTION 13: DISPOSAL CONSIDERATIONS

Consult local, state or federal regulatory agencies for acceptable disposal procedures and disposal locations. Disposal in streams or sewers is generally contrary to federal, state, and local regulations. For Hazardous Waste Regulations call (800) 424-9346, the RCRA Hotline.

SECTION 14: TRANSPORT INFORMATION

	5-10% Ammonia Solutions	>10-19.9% Ammonia Solutions
Proper shipping name:	Corrosive Liquid, N.O.S. (contains ammonia)	Ammonium Hydroxide
DOT Hazard Class:	8	8
Identification Number:	UN1760	UN2672
Packing Group:	III	III

SECTION 15: REGULATORY INFORMATION

NOTICE: This product is subject to the reporting requirements of SARA (1986, Section 313 of Title III) and 40 CFR Part 370.

CERCLA/SUPERFUND, 40 CFR 117.302: Unpermitted releases of 1,000 lb. or more of ammonium hydroxide in any 24-hour period must be reported immediately to the NRC at 1-800-424-8802, the SERC, and the LEPC. Written follow-up is required to SERC & LEPC.

OSHA HAZARD COMMUNICATION RULE, 20 CFR 1910.1200: Aqua ammonia is a hazardous chemical.

TOXIC SUBSTANCE CONTROL ACT: This material is listed in the TSCA Inventory.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (SARA, TITLE III): Section 302 Extremely Hazardous Substance: Yes; Section 311/312 Hazardous Categories: Immediate (Acute) Health Hazards; Section 313 Toxic Chemical: Yes (as ammonia); **WHMIS:** One percent (1%) as ammonia. **CALIFORNIA PROPOSITION 65:** Reproductive: No Carcinogen: No

OSHA PROCESS SAFETY MANAGEMENT, 29 CFR 1910.119: This product is NOT subject to the Process Safety Management requirements of 29 CFR 1910.119.

EPA CHEMICAL ACCIDENTAL RELEASE PREVENTION, 40 CFR PART 68: This product is NOT subject to the Risk Management

Plan requirements of 40 CFR Part 68. **DRINKING WATER:** Maximum use dosage in potable water is 10mg/l.

SECTION 16: OTHER INFORMATION

REASON FOR REVISION: 1. Addition of new Toll Free Customer Service Number in Section 1. 2. Revision to concentration range in section 2. 3. Revision to proper DOT Shipping Name. 4. Revision to EPCRA Section 302 information in Section 15; 6. Revised LEL and UEL. 7. Company Name Change. 8. Revised LEL and UEL. 9. Company Address Changed.

MSDS PREPARED BY: Airgas Specialty Products

This information is taken from sources or based upon data believed to be reliable, however, Airgas Specialty Products makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.

Attachment I

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
CT-01	CT-01	Turbine (Titan 130-20502S)	2018	20,500 bhp	New	SCR-01, OxCat-01
CT-02	CT-02	Turbine (Mars 100-16000S)	2018	15,900 bhp	New	SCR-02, OxCat-02
CT-03	CT-03	Turbine (Taurus 70-10802S)	2018	10,915 bhp	New	SCR-03, OxCat-03
CT-04	CT-04	Turbine (Taurus 60-7800S)	2018	7,700 bhp	New	SCR-04, OxCat-04
EG-01	EG-01	Emergency Generator (Caterpillar G3516C)	2018	2,098 bhp	New	None
WH-1	WH-1	Boiler	2018	10.7 MMBtu/hr	New	None
TK-1	TK-1	Accumulator Tank	2018	2,500 gallons	New	None
TK-2	TK-2	Hydrocarbon (Waste Oil) Tank	2018	2,000 gallons	New	None
TK-3	TK-3	Ammonia Tank	2018	8,000 gallons	New	None
LR-1	LR-1	Tank Unloading Operations	2018	--	New	None

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

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

³ New, modification, removal

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

Attachment J

**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 (mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
CT-01	Upward Vertical Stack	CT-01	Turbine	NA	NA	NA	NA	CO	9.93	43.09	6.36	27.84	Gas	AP-42, Vendor Estimates	NA
								NO _x	6.14	26.63	3.43	15.01			
								SO ₂	0.59	2.58	0.59	2.58			
								Total VOCs	0.56	2.41	0.33	1.43			
								PM Filterable	1.01	4.36	1.00	4.36			
								PM Condensable	2.49	10.80	2.46	10.80			
								PM _{2.5}	1.01	4.36	1.00	4.36			
								PM ₁₀	1.01	4.36	1.00	4.36			
								Total HAPs	0.22	0.96	0.22	0.96			
								Ammonia	2.35	10.20	2.33	10.20			
								CO ₂	20,763	90,075	20,593	90,196			
								CH ₄	1.50	6.52	1.69	7.40			
								N ₂ O	0.52	2.27	0.52	2.27			
CO ₂ e	20,956	90,915	20,790	91,059											
CT-02	Upward Vertical Stack	CT-02	Turbine	NA	NA	NA	NA	CO	8.17	35.46	4.73	20.73	Gas	AP-42, Vendor Estimates	NA
								NO _x	5.04	21.86	2.81	12.30			
								SO ₂	0.49	2.12	0.48	2.12			
								Total VOCs	0.46	1.97	0.26	1.14			
								PM Filterable	0.83	3.60	0.82	3.60			
								PM Condensable	2.05	8.90	2.03	8.90			
								PM _{2.5}	0.83	3.60	0.82	3.60			
								PM ₁₀	0.83	3.60	0.82	3.60			
								Total HAPs	0.18	0.79	0.18	0.79			
								Ammonia	1.87	8.12	1.85	8.12			
								CO ₂	17,126	74,298	16,983	74,385			
								CH ₄	1.24	5.37	1.37	6.00			
								N ₂ O	0.43	1.87	0.43	1.87			
CO ₂ e	17,286	74,991	17,145	75,094											

CT-03	Upward Vertical Stack	CT-03	Turbine	NA	NA	NA	NA	NA	5.48	23.79	2.99	13.08	Gas	AP-42, Vendor Estimates	NA
									3.42	14.86	1.91	8.35			
									0.33	1.43	0.33	1.43			
									0.31	1.36	0.18	0.78			
									0.56	2.42	0.55	2.42			
									1.38	5.99	1.37	5.99			
									0.56	2.42	0.55	2.42			
									0.56	2.42	0.55	2.42			
									0.12	0.53	0.12	0.53			
									1.33	5.77	1.32	5.77			
									11,521	49,980	11,423	50,035			
									0.83	3.62	0.91	4.00			
									0.29	1.26	0.29	1.26			
									11,628	50,446	11,532	50,511			
CT-04	Upward Vertical Stack	CT-04	Turbine	NA	NA	NA	NA	NA	4.14	17.95	1.93	8.46	Gas	AP-42, Vendor Estimates	NA
									2.58	11.21	1.43	6.28			
									0.25	1.08	0.25	1.08			
									0.23	1.01	0.13	0.56			
									0.42	1.83	0.42	1.83			
									1.04	4.53	1.03	4.53			
									0.42	1.83	0.42	1.83			
									0.42	1.83	0.42	1.83			
									0.09	0.41	0.09	0.41			
									0.99	4.29	0.98	4.29			
									8,716	37,813	8,640	37,843			
									0.63	2.73	0.68	2.96			
									0.22	0.95	0.22	0.95			
									8,797	38,165	8,722	38,201			
EG-01	Upward Vertical Stack	EG-01	Emergency Generator	NA	NA	NA	NA	NA	1.80	0.45	0.10	0.45	Gas	AP-42, Vendor Estimates	NA
									0.46	0.12	0.03	0.12			
									0.49	0.12	0.03	0.12			
									0.11	0.03	0.01	0.03			
									0.03	0.007	0.002	0.01			
									0.11	0.03	0.01	0.03			
									0.11	0.03	0.01	0.03			
									0.09	0.02	0.005	0.02			
									411.54	102.88	23.49	102.88			
									4.12	1.03	0.24	1.03			
									514.65	128.66	29.38	128.66			

WH-01	Upward Vertical Stack	WH-01	Boiler	NA	NA	NA	NA	CO NO _x SO ₂ Total VOCs PM _{Filterable} PM _{Condensable} PM _{2.5} PM ₁₀ Total HAPs CO ₂ CH ₄ N ₂ O CO _{2e}	0.89 0.53 0.01 0.06 0.02 0.06 0.02 0.02 0.02 1,271 0.02 0.02 1,278	3.86 2.30 0.03 0.25 0.09 0.26 0.09 0.02 0.09 5,514 0.11 0.10 5,546	0.88 0.52 0.01 0.06 0.02 0.06 0.02 0.02 0.02 1,259 0.02 0.02 1,266	3.86 2.30 0.03 0.25 0.09 0.26 0.09 0.02 0.09 5,514 0.11 0.10 5,546	Gas	AP-42	NA
LR-01	Upward Vertical Stack	LR-1	Loading Rack	NA	NA	NA	NA	Total VOCs	0.001	0.006	0.001	0.006	Gas	AP-42, Vendor Estimate	NA

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

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

**Attachment J
EMISSION POINTS DATA SUMMARY SHEET**

Table 2: Release Parameter Data

Emission Point ID No. <i>(Must match Emission Units Table)</i>	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow ¹ (acfm) <i>at operating conditions</i>	Velocity (fps)	Ground Level (Height above mean sea level)	Stack Height ² (Release height of emissions above ground level)	Northing	Eastings
EG-01	0.5	840	311.74	61.12	1,273	5.00	4,332.66	545.53
WH-01	0.67	838	5,179.00	247.30	1,273	18.00	4,332.66	545.53
CT-01	8	750	277,243	93.32	1,273	61.03	4,332.66	545.53
CT-02	8	750	220,785	72.38	1,273	61.03	4,332.66	545.53
CT-03	8	750	148,553	132.36	1,273	50.01	4,332.66	545.53
CT-04	8	750	116,559	93.37	1,273	50.01	4,332.66	545.53

Attachment K

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

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

FUGITIVE EMISSIONS SUMMARY		All Regulated Pollutants - Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
			lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads		N/A	N/A	N/A	N/A	N/A	N/A
Unpaved Haul Roads		N/A	N/A	N/A	N/A	N/A	N/A
Storage Pile Emissions		N/A	N/A	N/A	N/A	N/A	N/A
Loading/Unloading Operations		VOCs	<0.01	<0.01	<0.01	<0.01	AP-42 Section 5.2
Wastewater Treatment Evaporation & Operations		N/A	N/A	N/A	N/A	N/A	N/A
Equipment Leaks		VOCs	11.76	51.53	11.76	51.53	EPA- 453
General Clean-up VOC Emissions		N/A	N/A	N/A	N/A	N/A	N/A
Other		N/A	N/A	N/A	N/A	N/A	N/A

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

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

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

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

Attachment L

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*): **CT-01**

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Turbines, Titan 130-20502S 170 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>NA</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>NA</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>NA</p>

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

6. Combustion Data (if applicable):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
Natural Gas Fuel – As Required					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
NA					
(c) Theoretical combustion air requirement (ACF/unit of fuel):					
NA	@	NA	°F and	NA	psia.
(d) Percent excess air: NA					
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:					
NA					
(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:					
NA					
(g) Proposed maximum design heat input: NA × 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:				
@	NA	°F and	Ambient	psia
a. NO _x		3.43 lb/hr	NA	grains/ACF
b. SO ₂		0.59 lb/hr	NA	grains/ACF
c. CO		6.36 lb/hr	NA	grains/ACF
d. PM/PM ₁₀ /PM _{2.5}		1.00 lb/hr	NA	grains/ACF
e. Hydrocarbons		NA lb/hr	NA	grains/ACF
f. VOCs		0.33 lb/hr	NA	grains/ACF
g. Pb		NA lb/hr	NA	grains/ACF
h. Specify other(s)				
CO _{2e}		20,790 lb/hr	NA	grains/ACF
Total HAPs		0.22 lb/hr	NA	grains/ACF
Total Ammonia		2.33 lb/hr	NA	grains/ACF
		lb/hr	NA	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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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

NA

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*): **CT-02**

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Turbines, Mars 100 16000S 140 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>NA</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>NA</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>NA</p>

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

6. Combustion Data (if applicable):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
Natural Gas Fuel – As Required					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
NA					
(c) Theoretical combustion air requirement (ACF/unit of fuel):					
NA	@	NA	°F and	NA	psia.
(d) Percent excess air: NA					
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:					
NA					
(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:					
NA					
(g) Proposed maximum design heat input: NA × 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:				
@	NA	°F and	Ambient	psia
a. NO _x		2.79 lb/hr	NA	grains/ACF
b. SO ₂		0.48 lb/hr	NA	grains/ACF
c. CO		2.77 lb/hr	NA	grains/ACF
d. PM/PM ₁₀ /PM _{2.5}		2.14 lb/hr	NA	grains/ACF
e. Hydrocarbons		NA lb/hr	NA	grains/ACF
f. VOCs		0.24 lb/hr	NA	grains/ACF
g. Pb		NA lb/hr	NA	grains/ACF
h. Specify other(s)				
CO _{2e}		17,130 lb/hr	NA	grains/ACF
Total HAPs		0.04 lb/hr	NA	grains/ACF
Total Ammonia		1.85 lb/hr	NA	grains/ACF
		lb/hr	NA	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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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

NA

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*): **CT-03**

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Turbines, Taurus 70-10802S 94.5 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>NA</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>NA</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>NA</p>

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

6. Combustion Data (if applicable):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
Natural Gas Fuel – As Required					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
NA					
(c) Theoretical combustion air requirement (ACF/unit of fuel):					
NA	@	NA	°F and	NA	psia.
(d) Percent excess air: NA					
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:					
NA					
(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:					
NA					
(g) Proposed maximum design heat input: NA × 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:					
@	NA	°F and		Ambient	psia
a. NO _x		1.89	lb/hr	NA	grains/ACF
b. SO ₂		0.33	lb/hr	NA	grains/ACF
c. CO		1.79	lb/hr	NA	grains/ACF
d. PM/PM ₁₀ /PM _{2.5}		1.44	lb/hr	NA	grains/ACF
e. Hydrocarbons		NA	lb/hr	NA	grains/ACF
f. VOCs		0.16	lb/hr	NA	grains/ACF
g. Pb		NA	lb/hr	NA	grains/ACF
h. Specify other(s)					
CO _{2e}		11,523	lb/hr	NA	grains/ACF
Total HAPs		0.03	lb/hr	NA	grains/ACF
Ammonia		1.32	lb/hr	NA	grains/ACF
			lb/hr	NA	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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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

NA

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*): **CT-04**

<p>1. Name or type and model of proposed affected source:</p> <p>Solar Turbines, Taurus 60-7800S 71.4 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>NA</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>NA</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>NA</p>

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

6. Combustion Data (if applicable):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
Natural Gas Fuel – As Required					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
NA					
(c) Theoretical combustion air requirement (ACF/unit of fuel):					
NA	@	NA	°F and	NA	psia.
(d) Percent excess air: NA					
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:					
NA					
(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:					
NA					
(g) Proposed maximum design heat input: NA × 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:

@	NA	°F and	Ambient	psia
a. NO _x	1.43	lb/hr	NA	grains/ACF
b. SO ₂	0.25	lb/hr	NA	grains/ACF
c. CO	1.93	lb/hr	NA	grains/ACF
d. PM/PM ₁₀ /PM _{2.5}	0.42	lb/hr	NA	grains/ACF
e. Hydrocarbons	NA	lb/hr	NA	grains/ACF
f. VOCs	0.13	lb/hr	NA	grains/ACF
g. Pb	NA	lb/hr	NA	grains/ACF
h. Specify other(s)				
CO _{2e}	8,722	lb/hr	NA	grains/ACF
Total HAPs	0.09	lb/hr	NA	grains/ACF
Ammonia	0.98	lb/hr	NA	grains/ACF
		lb/hr	NA	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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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

NA

Attachment L

Affected Sources Data

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Source Identification Number ¹		EG-01	
Engine Manufacturer and Model		CATERPILLAR G3516C	
Manufacturer's Rated bhp/rpm		2,046 BHP @1800 RPM	
Source Status ²		New Source (NS)	
Date Installed/Modified/Removed ³		2016	
Engine Manufactured/Reconstruction Date ⁴		NA	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No) ⁵		No	
Engine, Fuel and Combustion Data	Engine Type ⁶	LB4S	
	APCD Type ⁷	NA	
	Fuel Type ⁸	PG	
	H ₂ S (gr/100 scf)	0.25	
	Operating bhp/rpm	2,046 BHP @1800 RPM	
	BSFC (Btu/bhp-hr)	6,935	
	Fuel throughput (ft ³ /hr)	16,080	
	Fuel throughput (MMft ³ /yr)	8.04	
	Operation (hrs/yr)	500	
Reference ⁹	Potential Emissions ¹⁰	lbs/hr	tons/yr
Vendor Estimate	NO _x	0.03	0.12
Vendor Estimate	CO	0.10	0.45
Vendor Estimate	VOC	0.03	0.12
AP-42 Chapter 3.2	SO ₂	<0.001	<0.001
AP-42 Chapter 3.2	PM ₁₀	0.01	0.03
Vendor Estimate	Formaldehyde	2.41	0.60

Attachment L

Affected Sources Data

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.
2. Enter the Source Status using the following codes:
NS Construction of New Source (installation) ES Existing Source
MS Modification of Existing Source RS Removal of Source
3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.
4. Enter the date that the engine was manufactured, modified or reconstructed.
5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6. Enter the Engine Type designation(s) using the following codes:
LB2S Lean Burn Two Stroke RB4S Rich Burn Four Stroke
LB4S Lean Burn Four Stroke
7. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:
A/F Air/Fuel Ratio IR Ignition Retard
HEIS High Energy Ignition System SIPC Screw-in Precombustion Chambers
PSC Prestratified Charge LEC Low Emission Combustion
NSCR Rich Burn & Non-Selective Catalytic Reduction SCR Lean Burn & Selective Catalytic Reduction
8. Enter the Fuel Type using the following codes:
PQ Pipeline Quality Natural Gas RG Raw Natural Gas
9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.
MD Manufacturer's Data AP AP-42
GR GRI-HAPCalc™ OT Other _____ (please list)
10. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

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*): **WH-01**

1. Name or type and model of proposed affected source: Boiler 10.7 MMBtu/hr
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: NA
4. Name(s) and maximum amount of proposed material(s) produced per hour: NA
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: NA

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

6. Combustion Data (if applicable):					
(a) Type and amount in appropriate units of fuel(s) to be burned:					
Natural Gas Fuel - As Required					
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:					
NA					
(c) Theoretical combustion air requirement (ACF/unit of fuel):					
NA	@	NA	°F and	NA	psia.
(d) Percent excess air: NA					
(e) Type and BTU/hr of burners and all other firing equipment planned to be used:					
NA					
(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:					
NA					
(g) Proposed maximum design heat input: NA × 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:					
@	NA	°F and		Ambient	psia
a. NO _x		0.52	lb/hr	NA	grains/AC F
b. SO ₂		0.01	lb/hr	NA	grains/AC F
c. CO		0.88	lb/hr	NA	grains/AC F
d. PM/PM ₁₀ /PM _{2.5}		0.02	lb/hr	NA	grains/AC F
e. Hydrocarbons		NA	lb/hr	NA	grains/AC F
f. VOCs		0.06	lb/hr	NA	grains/AC F
g. Pb		NA	lb/hr	NA	grains/AC F
h. Specify other(s)					
CO _{2e}		1,259	lb/hr	NA	grains/AC F
Total HAPs		0.02	lb/hr	NA	grains/AC F
PM Condensable		0.06	lb/hr	NA	grains/AC F
			lb/hr	NA	grains/AC F

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
See Attachment O

RECORDKEEPING
See Attachment O

REPORTING
See Attachment O

TESTING
See Attachment O

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

NA

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Tank Area	2. Tank Name Pipeline Liquids Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) TK-1	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) NA
5. Date of Commencement of Construction (for existing tanks) 2018	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 2,500 gal	
9A. Tank Internal Diameter (ft) 4.61	9B. Tank Internal Height (or Length) (ft) 20
10A. Maximum Liquid Height (ft) 18	10B. Average Liquid Height (ft) 10
11A. Maximum Vapor Space Height (ft) 18	11B. Average Vapor Space Height (ft) 10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 2,500 gallons	

13A. Maximum annual throughput (gal/yr) 12,500 gal	13B. Maximum daily throughput (gal/day) 34.25 gal
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 5	
15. Maximum tank fill rate (gal/min) 0.024	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal) NA	17B. Number of transfers into system per year NA
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input type="checkbox"/> vertical <input checked="" type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary)

19. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded		
20A. Shell Color Light Grey	20B. Roof Color Light Grey	20C. Year Last Painted N/A
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig):		
24. Complete the following section for Vertical Fixed Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:			
ACCESS HATCH			
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED UNGASKETED:	COVER,
AUTOMATIC GAUGE FLOAT WELL			
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED UNGASKETED:	COVER,
COLUMN WELL			
BUILT-UP COLUMN - SLIDING COVER, GASKETED:	BUILT-UP COLUMN - SLIDING COVER, UNGASKETED:	PIPE COLUMN - FLEXIBLE FABRIC SLEEVE SEAL:	
LADDER WELL			
PIP COLUMN - SLIDING COVER, GASKETED:	PIPE COLUMN - SLIDING COVER, UNGASKETED:		
GAUGE-HATCH/SAMPLE PORT			
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:		
ROOF LEG OR HANGER WELL			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)	
VACUUM BREAKER			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:		
RIM VENT			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:		
DECK DRAIN (3-INCH DIAMETER)			
OPEN:	90% CLOSED:		
STUB DRAIN			
1-INCH DIAMETER:			
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)			

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type:	<input type="checkbox"/> Bolted <input type="checkbox"/> Welded
26B. For Bolted decks, provide deck construction:	
26C. Deck seam:	
<input type="checkbox"/> Continuous sheet construction 5 feet wide	
<input type="checkbox"/> Continuous sheet construction 6 feet wide	
<input type="checkbox"/> Continuous sheet construction 7 feet wide	
<input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide	
<input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide	
<input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F) 70 °F
29. Annual Average Maximum Temperature (°F) 65.5 °F
30. Annual Average Minimum Temperature (°F) 44.0 °F
31. Average Wind Speed (miles/hr) 18 mph
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day)) 1,123
33. Atmospheric Pressure (psia) 14.70

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid: Ambient			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for each liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition	Pipeline Fluids		
39B. CAS Number	NA		
39C. Liquid Density (lb/gal)	5.47		
39D. Liquid Molecular Weight (lb/lb-mole)	84.91		
39E. Vapor Molecular Weight (lb/lb-mole)	84.91		

Attachment L

EMISSIONS UNIT DATA SHEET

STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Tank Area	2. Tank Name Hydrocarbon (Waste Oil) Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) TK-2	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) NA
5. Date of Commencement of Construction (for existing tanks) 2018	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 2,000 gal	
9A. Tank Internal Diameter (ft) 4.12	9B. Tank Internal Height (or Length) (ft) 10
10A. Maximum Liquid Height (ft) 8	10B. Average Liquid Height (ft) 5
11A. Maximum Vapor Space Height (ft) 8	11B. Average Vapor Space Height (ft) 5
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 1,000	

13A. Maximum annual throughput (gal/yr) 10,000 gal	13B. Maximum daily throughput (gal/day) 27.40 gal
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 5	
15. Maximum tank fill rate (gal/min) 0.02	
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal) NA	17B. Number of transfers into system per year NA
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof ___ vertical <input checked="" type="checkbox"/> horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary)

19. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) Welded		
20A. Shell Color Light Grey	20B. Roof Color Light Grey	20C. Year Last Painted N/A
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig):		
24. Complete the following section for Vertical Fixed Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:			
ACCESS HATCH			
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED UNGASKETED:	COVER,
AUTOMATIC GAUGE FLOAT WELL			
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED UNGASKETED:	COVER,
COLUMN WELL			
BUILT-UP COLUMN - SLIDING COVER, GASKETED:	BUILT-UP COLUMN - SLIDING COVER, UNGASKETED:	PIPE COLUMN - FLEXIBLE FABRIC SLEEVE SEAL:	
LADDER WELL			
PIP COLUMN - SLIDING COVER, GASKETED:	PIPE COLUMN - SLIDING COVER, UNGASKETED:		
GAUGE-HATCH/SAMPLE PORT			
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:		
ROOF LEG OR HANGER WELL			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)	
VACUUM BREAKER			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:		
RIM VENT			
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:		
DECK DRAIN (3-INCH DIAMETER)			
OPEN:	90% CLOSED:		
STUB DRAIN			
1-INCH DIAMETER:			
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)			

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F) 70 °F
29. Annual Average Maximum Temperature (°F) 65.5 °F
30. Annual Average Minimum Temperature (°F) 44.0 °F
31. Average Wind Speed (miles/hr) 18 mph
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day)) 1,123
33. Atmospheric Pressure (psia) 14.70

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid: Ambient			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for each liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition	Used Oil		
39B. CAS Number	NA		
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)	200.00		
39E. Vapor Molecular Weight (lb/lb-mole)	380.00		

Maximum Vapor Pressure 39F. True (psia)	NA		
39G. Reid (psia)	NA		
Months Storage per Year 39H. From	January		
39I. To	December		

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): Does Not Apply

- Carbon Adsorption¹
- Condenser¹
- Conservation Vent (psig)

Vacuum Setting	Pressure Setting
----------------	------------------
- Emergency Relief Valve (psig)
- Inert Gas Blanket of
- Insulation of Tank with
- Liquid Absorption (scrubber)¹
- Refrigeration of Tank
- Rupture Disc (psig)
- Vent to Incinerator¹
- Other¹ (describe):

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		
*See calculations included in Attachment N.					

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L

EMISSIONS UNIT DATA SHEET

BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on <i>Equipment List Form</i>): LR-01				
1. Loading Area Name: Tank Truck Loading Area				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): <input type="checkbox"/> Drums <input type="checkbox"/> Marine Vessels <input type="checkbox"/> Rail Tank Car <input checked="" type="checkbox"/> Tank Trucks				
3. Loading Rack or Transfer Point Data:				
Number of pumps	1			
Number of liquids loaded	1			
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1			
4. Does ballasting of marine vessels occur at this loading area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Does not apply				
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: NA				
6. Are cargo vessels pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If YES, describe:				
7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	As Needed, expect a max. of 5 transfers/year			
days/week	As Needed, expect a max. of 5 transfers/year			
weeks/quarter	As Needed, expect a max. of 5 transfers/year			

8. Bulk Liquid Data (add pages as necessary):		
Pump ID No.	NA	
Liquid Name	Pipeline Fluids	
Max. daily throughput (1000 gal/day)	2.5	
Max. annual throughput (1000 gal/yr)	12.5	
Loading Method ¹	BF	
Max. Fill Rate (gal/min)	84	
Average Fill Time (min/loading)	30 min	
Max. Bulk Liquid Temperature (°F)	70 °F	
True Vapor Pressure ²	NA	
Cargo Vessel Condition ³	U	
Control Equipment or Method ⁴	NA	
Minimum control efficiency (%)	NA	
Maximum Emission Rate	Loading (lb/hr)	0.001
	Annual (lb/yr)	0.006
Estimation Method ⁵	EPA AP-42	
¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill		
² At maximum bulk liquid temperature		
³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)		
⁴ List as many as apply (complete and submit appropriate <i>Air Pollution Control Device Sheets</i>): CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption) CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)		
⁵ EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)		

<p>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.</p>	
<p>MONITORING</p> <p>Atlantic Coast Pipeline, LLC. will comply with all monitoring requirements set forth in the permit that is issued.</p>	<p>RECORDKEEPING</p> <p>Atlantic Coast Pipeline, LLC. will comply with all recordkeeping requirements set forth in the permit that is issued.</p>
<p>REPORTING</p> <p>Atlantic Coast Pipeline, LLC. will comply with all reporting requirements set forth in the permit that is issued.</p>	<p>TESTING</p> <p>Atlantic Coast Pipeline, LLC. will comply with all testing requirements set forth in the permit that is issued.</p>
<p>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.</p>	
<p>RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.</p>	
<p>REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.</p>	
<p>TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/ AIR POLLUTION CONTROL DEVICE.</p>	
<p>10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty</p> <p>NA</p>	

Attachment M

**Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)**

Control Device ID No. (must match Emission Units Table): **SCR-01**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Titan Solar Titan 130 SCR	2. Control Device Name: SCR-01 Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 215,260 ACFM	10. Capacity: 215,260 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Aqueous Ammonia flowrate – 2.52 gal per hour	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **OxCat-01**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Titan 130 OxCat	2. Control Device Name: OxCat-01 Type: Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 215,260 ACFM	10. Capacity: 215,260 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. NA	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80 %

VOCs - 50%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80 %

VOCs - 50%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **SCR-02**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Mars 100 SCR	2. Control Device Name: SCR-02 Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 177,388 ACFM	10. Capacity: 177,388 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Aqueous Ammonia flowrate – 1.96 gal per hour	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

16. Type of pollutant(s) controlled: <input type="checkbox"/> SO _x <input type="checkbox"/> Odor <input type="checkbox"/> Particulate (type): <input checked="" type="checkbox"/> Other NO _x ,				
17. Inlet gas velocity: _____ ft/sec	18. Pollutant specific gravity:			
19. Gas flow into the collector: 177,388 ACF @ 750 °F and _____ PSIA	20. Gas stream temperature: Inlet: 750 °F Outlet: 750 °F			
21. Gas flow rate: Design Maximum: _____ ACFM Average Expected: _____ ACFM	22. Particulate Grain Loading in grains/scf: Inlet: Outlet:			
23. Emission rate of each pollutant (specify) into and out of collector:				
Pollutant	IN Pollutant	Emission Capture Efficiency %	OUT Pollutant	Control Efficiency %
	lb/hr	grains/acf	lb/hr	grains/acf
NO _x	5.04		2.81	44%
24. Dimensions of stack: _____ Height _____ ft. _____ Diameter _____ ft.				
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.				

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2	NA	NA
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x - 44%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x -44%

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

NA

Attachment M
Air Pollution Control Device Sheet
(Other Collectors)

Control Device ID No. (must match Emission Units Table): **OxCat-02**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Mars 100 OxCat	2. Control Device Name: OxCat-02 Type: Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 177,388 ACFM	10. Capacity: 177,388 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. NA	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80%

VOCs - 50%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80%

VOCs - 50%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **SCR-03**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Taurus 70 SCR	2. Control Device Name: SCR-03 Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 112,383 ACFM	10. Capacity: 112,383 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. NA	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included **Other Collectores Control Device** in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **OxCat-03**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Taurus 70 OxCat	2. Control Device Name: OxCat-03 Type: Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 112,383 ACFM	10. Capacity: 112,383 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. NA	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included **Other Collectores Control Device** in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO – 80%

VOCs – 50%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO – 80%

VOCs – 50%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **SCR-04**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Taurus 60 SCR	2. Control Device Name: SCR-04 Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 96,052 ACFM	10. Capacity: 96,052 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Aqueous Ammonia flowrate – 1.08 gal per hour	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included **Other Collectores Control Device** in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

NO_x – 44%

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

NA

Attachment M
Air Pollution Control Device Sheet
 (OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **OxCat-04**

Equipment Information

1. Manufacturer: Peerless Manufacturing Company Model No. Solar Taurus 60 OxCat	2. Control Device Name: OxCat-04 Type: Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: NA	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 96,052 ACFM	10. Capacity: 96,052 ACFM
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. NA	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. NA	

Gas Stream Characteristics

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
15. Inlet Emission stream parameters:	Maximum	Typical	
Pressure (mmHg):			
Heat Content (BTU/scf):			
Oxygen Content (%):		15%	
Moisture Content (%):			
Relative Humidity (%):			

16. Type of pollutant(s) controlled: <input type="checkbox"/> SO _x <input type="checkbox"/> Odor <input type="checkbox"/> Particulate (type): <input checked="" type="checkbox"/> Other CO, VOCs				
17. Inlet gas velocity: _____ ft/sec	18. Pollutant specific gravity: _____			
19. Gas flow into the collector: 207,193 ACF @ 750 °F and _____ PSIA	20. Gas stream temperature: Inlet: 750 °F Outlet: 750 °F			
21. Gas flow rate: Design Maximum: _____ ACFM Average Expected: _____ ACFM	22. Particulate Grain Loading in grains/scf: Inlet: _____ Outlet: _____			
23. Emission rate of each pollutant (specify) into and out of collector:				
Pollutant	IN Pollutant	Emission Capture Efficiency %	OUT Pollutant	Control Efficiency %
	lb/hr	grains/acf	lb/hr	grains/acf
CO	4.11		0.82	80
VOCs	0.23		0.12	50
24. Dimensions of stack: _____ Height _____ ft. _____ Diameter _____ ft.				
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.				

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2	NA	NA
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

NA

28. Describe the collection material disposal system:

NA

29. Have you included *Other Collectores Control Device* in the Emissions Points Data Summary Sheet?

30. 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:

ACP will comply with all monitoring requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

RECORDKEEPING:

ACP will comply with all recordkeeping requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

REPORTING:

ACP will comply with all reporting requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

TESTING:

ACP will comply with all testing requirements set forth in the permit that is issued. Please see section 6 of the introduction document where proposed MRRT is discussed.

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 or air control device.

RECORDKEEPING:

Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING:

Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80 %

VOCs - 50%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

CO - 80 %

VOCs - 50%

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

NA

Attachment N

**Table N-1 Permit to Construct Application Project Equipment List
ACP Marts Compressor Station - Lewis County, West Virginia**

Emission Point ID	Source	Manufacturer	Model/Type	Rated Capacity
CT-01	Compressor Turbine	Solar Turbines	Titan 130-20502S	21,765 hp
CT-02	Compressor Turbine	Solar Turbines	Mars 100-16000S	17,574 hp
CT-03	Compressor Turbine	Solar Turbines	Taurus 70-10802S	11,882 hp
CT-04	Compressor Turbine	Solar Turbines	Taurus 60-7800S	8,414 hp
EG-01	Emergency Generator	Caterpillar	G3516C	2,098 hp
WH-01	Boiler	TBD	TBD	10.7 MMBtu/hr
FUG-01	Fugitive Leaks - Blowdowns	-	-	-
FUG-02	Fugitive Leaks - Piping	-	-	-
TK-1	Accumulator Tank	-	-	2,500 gal
TK-2	Hydrocarbon (Waste Oil) Tank	--	--	2,000 gal
TK-3	Ammonia Tank	--	--	8,000 gal
LR-01	Truck Loading Rack	--	--	90 gal/min

Table N-2 Potential Emissions From Combustion Sources
ACP Morris Compressor Station - Lewis County, West Virginia

Turbine Operational Parameters:		Generator Operational Parameters:		Boiler/Heater Operational Parameters:	
Normal Hours of Operation:	8,677	Normal Hours of Operation:	100	Normal Hours of Operation:	8,760
Hours at Low Load (<50%):	0				
Hours of Low Temp. (<0 deg. F):	50				
Hours of Start-up/Shutdown:	33.3				
Total Hours of Operation (hr/yr):	8,760				

Pre-Control Potential to Emit:

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)				GHG Emissions (tpy)						Ammonia (tpy) NH3	HAP (tpy) Total HAP
				NOx	CO	VOC	SO2	PM10	PMF	CO2	CH4	N2O	CO2e		
Solar Titan 130 Turbine	21,785	hp	Natural Gas	26.6	43.1	2.41	2.59	4.36	10.8	90,075	6.52	2.27	90,915	10.2	0.962
Solar Mars 100 Turbine	17,574	hp	Natural Gas	21.9	35.5	1.97	2.12	3.60	6.90	74,298	5.37	1.87	74,991	8.12	0.785
Solar Taurus 70 Turbine	11,862	hp	Natural Gas	14.9	23.8	1.36	1.43	2.42	5.99	49,980	3.62	1.26	50,446	5.77	0.525
Solar Taurus 60 Turbine	8,414	hp	Natural Gas	11.2	18.0	1.01	1.08	1.83	4.53	37,813	2.7	0.95	38,165	4.29	0.410
Caterpillar G3516C Egen	2,098	hp	Natural Gas	0.116	0.451	0.123	0.0004	0.0279	0.0279	103	1.03	0	129	0	0.0213
Boiler	10.7	MMBtu/hr	Natural Gas	2.30	3.86	0.253	0.0276	0.0873	0.262	5,514	0.106	0.101	5,546	0	0.0668
Total (tons/yr)				77.0	125	7.13	7.24	12.3	30.5	257,782	19.4	6.46	260,193	28.4	2.790

Turbine Control Efficiencies

Control Technology:	NOx	CO	VOC
Selective Catalytic Reduction	44%	-	-
Oxidation Catalyst	-	80%	50%

Post-Control Potential to Emit

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)				GHG Emissions (tpy)						Ammonia (tpy) NH3	HAP (tpy) Total HAP
				NOx	CO	VOC	SO2	PM10	PMF	CO2	CH4	N2O	CO2e		
Solar Titan 130 Turbine	21,785	hp	Natural Gas	14.8	8.82	1.21	2.58	4.36	10.8	90,075	6.52	2.27	90,915	10.2	0.962
Solar Mars 100 Turbine	17,574	hp	Natural Gas	12.1	7.09	0.987	2.12	3.60	6.90	74,298	5.37	1.87	74,991	8.12	0.785
Solar Taurus 70 Turbine	11,862	hp	Natural Gas	8.25	4.76	0.590	1.43	2.42	5.99	49,980	3.62	1.26	50,446	5.77	0.525
Solar Taurus 60 Turbine	8,414	hp	Natural Gas	6.23	3.59	0.505	1.08	1.83	4.53	37,813	2.73	0.954	38,165	4.29	0.410
Caterpillar G3516C Egen	2,098	hp	Natural Gas	0.116	0.451	0.123	0.0004	0.0279	0.0279	103	1.03	0	129	0	0.0213
Boiler	10.7	MMBtu/hr	Natural Gas	2.30	3.86	0.253	0.028	0.087	0.262	5,514	0.106	0.101	5,546	0.00	0.0668
Total (tons/yr)				43.8	28.4	3.75	7.24	12.3	30.5	257,782	19.4	6.46	260,193	28.4	2.790

Notes:

- (1) Turbine emissions are calculated by the following formula: $ER \cdot \text{Run Hours} / 2000 \cdot (1 - \text{Control Efficiency})$
 ER = Emission Rate for particular equipment and pollutant (lbs/hr)
 2000 = the amount of lbs in a ton
- (2) Emergency Generator emissions are calculated by the following formula: $\text{Power Rating} \cdot \text{Run Hours} \cdot EF / 2000$
 Power Rating = Engine hp rating (hp)
 EF = Emission Factor from either manufacturer's data or AP-42 (lb/hp-hr)
 2000 = the amount of lbs in a ton
- (3) Boiler/Heater emissions calculated by the following formula: $EF \cdot \text{Power Rating} \cdot \text{Run Hours} / \text{HHV} / 2000$
 EF = AP-42 Emission Factor (lb/MMSCF)
 Power Rating = Boiler/Heater Heat Capacity (MMBtu/hr)
 HHV = Natural Gas High Heating Value (1020 MMBtu/MMSCF)
- (4) Turbines are equipped with Selective Catalytic Reduction (SCR) and oxidation catalyst for control of NOx (44%), CO (80%), and VOC (50%)
- (5) Emergency generator engine hp taken from manufacturer data
- (6) Boiler assumed to have low-NOx burners
- (7) See the "HAP Emissions" worksheet for a more detailed breakdown of HAP emissions
- (8) See Emissions Factors table for Emissions Factors for each operating scenario.

Table N-3 Event Based Potential Emissions From Combustion Sources
 ACP Marts Compressor Station - Lewis County, West Virginia

Start-up Emissions										
Combustion Source(s)	Power Rating	Unit(s)	Final Events	Start-up Events	NOx	CO	VOC	GHG Emissions (ton)		
								CO ₂	CH ₄	CO _{2e}
Solar Team 130 Turbine	21,025	TP	Natural Gas	100	0.0550	8.85	0.101	55.1	0.404	88.2
Solar Team 70 Turbine	17,574	TP	Natural Gas	100	0.0700	8.18	0.0710	41.5	0.294	48.6
Solar Team 60 Turbine	14,023	TP	Natural Gas	100	0.0850	6.50	0.0650	26.0	0.198	30.2
Solar Team 50 Turbine	10,472	TP	Natural Gas	100	0.1000	4.82	0.0500	18.5	0.148	24.2
Total (tons/yr)					0.240	24.5	0.281	143	1.08	171

Shutdown Emissions										
Combustion Source(s)	Power Rating	Unit(s)	Final Events	Shutdown Events	NOx	CO	VOC	GHG Emissions (ton)		
								CO ₂	CH ₄	CO _{2e}
Solar Team 130 Turbine	21,025	TP	Natural Gas	100	0.120	10.4	0.119	63.6	0.776	76.5
Solar Team 70 Turbine	17,574	TP	Natural Gas	100	0.0950	7.46	0.0950	48.0	0.340	54.5
Solar Team 60 Turbine	14,023	TP	Natural Gas	100	0.1100	5.97	0.1030	28.8	0.212	34.1
Solar Team 50 Turbine	10,472	TP	Natural Gas	100	0.1300	4.48	0.118	21.2	0.160	22.1
Total (tons/yr)					0.268	24.2	0.278	143	1.10	178

Total SUSD Emissions (tons/yr) 0.820 48.1 0.527 248 2.11 347

Compressor Blowdown Emissions	
Source Designator	FUG-D1

Blowdown Shutdown Events

Blowdown from Start-up	Blowdown from Shutdown
Volume: flow rate	60,000 scfd
Methane Molecular Weight	16
Shutdown Percent Weight	65%
Blowdown	2,803 lb/vent

Gas Composition

Molecular Weight (lb/mol)	Volume Fraction (wt. %)
None VOC	78.28
Carbon Dioxide	44.01 1.01%
Nitrogen	28.01 0.59%
Methane	16.04 34.21%
Ethane	30.07 2.95%
Propane	44.10 0.56%
n-Butane	58.12 0.08%
i-Butane	58.12 0.07%
n-Pentane	72.15 0.02%
i-Pentane	72.15 0.01%
n-Hexane	86.18 0.01%
Total VOC Fraction	100.32 1.04%
Total HAP Fraction	100.32 0.01%

Blowdown from Start-up Events

Combustion Source(s)	Start-up Events	VOC	CO ₂	CH ₄	GHG Emissions (tpd)		
					CO _{2e}	HAPs	CO _{2e}
Solar Team 130 Turbine	100	2,216	2,293	76.8	1,893	0.126	
Solar Team 70 Turbine	100	2,216	2,293	76.8	1,893	0.126	
Solar Team 60 Turbine	100	2,216	2,293	76.8	1,893	0.126	
Solar Team 50 Turbine	100	2,216	2,293	76.8	1,893	0.126	
Total (tons/yr)	400	8,864	9,172	305	7,672	0.504	

Blowdown from Shutdown Events

Combustion Source(s)	Shutdown Events	VOC	CO ₂	CH ₄	GHG Emissions (tpd)		
					CO _{2e}	HAPs	CO _{2e}
Solar Team 130 Turbine	100	3,677	3,800	125	3,138	0.207	
Solar Team 70 Turbine	100	3,677	3,800	125	3,138	0.207	
Solar Team 60 Turbine	100	3,677	3,800	125	3,138	0.207	
Solar Team 50 Turbine	100	3,677	3,800	125	3,138	0.207	
Total (tons/yr)	400	14,714	15,200	500	12,552	0.830	

Site-Wide Blowdown Events

Site-Wide Blowdown	Volume: flow rate	Methane Molecular Weight	Shutdown Percent Weight	Blowdown

Blowdown from Site-Wide Events

Combustion Source(s)	Startup Events	VOC	CO ₂	CH ₄	GHG Emissions (tpd)		
					CO _{2e}	HAPs	CO _{2e}
ACP-1	1	1,187	1,241	38.8	998	0.065	
Total (tons/yr)	1	1,187	1,241	38.8	998	0.065	

Total Blowdown Emissions (tons/yr) 24.7 24.8 844 21,124 1.40

**Table N-4 Combustion Source Criteria Pollutant Emission Factors
ACP Mars Compressor Station - Lewis County, West Virginia**

Equipment Name	Fuel	Units	Solar Turbine Normal Operation Emission Factors (lb/hr)										
			NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O
Solar Taurus 60 Turbine	Natural Gas	lb/hr	2.40	4.00	0.230	0.247	0.418	0.418	1.03	0.624	0.624	0.218	0.979
Solar Taurus 70 Turbine	Natural Gas	lb/hr	3.18	5.30	0.310	0.326	0.553	0.553	1.37	1.1411	0.828	0.288	1.32
Solar Mars 100 Turbine	Natural Gas	lb/hr	4.68	7.90	0.450	0.465	0.821	0.821	2.03	1.6963	1.23	0.428	1.85
Solar Titan 130 Turbine	Natural Gas	lb/hr	5.70	9.60	0.550	0.568	1.00	1.00	2.46	2.0565	1.48	0.519	2.33

Notes

- (1) Pre-Control Emission Rates for NOx, CO, VOC, PMF, PMC, and CO2 taken from Solar Turbine Data at 100% load and 0 degrees F
- (2) Emission Factors for SO2, CH4, N2O taken from AP-42 in (lbs/MMBtu) and multiplied by turbine fuel throughput by Solar Turbine at 100% load and 0 degree F to get Emission Rates
- (3) Assume PMF=PMF-10=PMF-2.5; Filtrable and Condensable based on Solar Turbine Emission Factor and ratio of AP-42 Table 3.1 factors
- (4) NH3 emission rates based on a 10 ppm ammonia slip from the SCR based on manufacturer information
- (5) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
- (6) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR Part 98]

Equipment Name	Fuel	Units	Solar Turbine Alternate Operation Emission Factors (lb/hr)											
			NOx	CO	VOC	NOx	CO	VOC	NOx	CO	VOC	NOx	CO	VOC
Solar Taurus 60 Turbine	Natural Gas	lb/hr	32.0	24.0	0.460	18.7	1.600	9.20						
Solar Taurus 70 Turbine	Natural Gas	lb/hr	42.4	31.8	0.620	24.7	2.120	12.4						
Solar Mars 100 Turbine	Natural Gas	lb/hr	62.4	47.4	0.900	36.4	3.160	18.0						
Solar Titan 130 Turbine	Natural Gas	lb/hr	76.0	57.6	1.10	44.33	3.840	22.0						

Notes

- (1) Pre-Control low temperature Emission Rates for NOx, CO, VOC. Conservatively assume 120 ppm NOx, 150 ppm CO, and 5 ppm VOC (10% of UHC) per Table 2 of Solar P.L. 167
- (2) Pre-Control low load Emission Rates for NOx, CO, VOC. Conservatively assume 70 ppm NOx, 10,000 ppm CO, and 100 ppm VOC (10% of UHC) per Table 4 of Solar P.L. 167

Equipment Name	Fuel	Units	Solar Turbine Start-up and Shutdown Emission Factors (lb/event)										
			NOx	CO	VOC	CH4	CO2e	CO	NOx	CO	VOC	CH4	CO2e
Solar Taurus 60 Turbine	Natural Gas	lb/event	0.700	84.3	0.740	410	2.96	484	0.400	33.0	204	1.52	242
Solar Taurus 70 Turbine	Natural Gas	lb/event	0.800	73.1	0.840	519	3.36	603	1.10	93.4	1.06	575	4.24
Solar Mars 100 Turbine	Natural Gas	lb/event	1.40	124	1.42	829	5.68	971	1.70	149	1.70	920	6.80
Solar Titan 130 Turbine	Natural Gas	lb/event	1.90	177	2.02	1161	8.08	1363	2.40	208	2.36	1272	9.52

Notes

- (1) Start-up and Shutdown Emissions based on Solar Turbines incorporated Product Information Letter 170: Emission Estimates at Start-up, Shutdown, and Commissioning for SolarNOx Combustion Products (13 June 2012). Emission Estimates do not include SO2, PM, N2O, or any HAPs.
- (2) VOCs assumed to be 20% of UHC and CH4 assumed to be 80% of UHC.
- (3) CO2e emission rate calculated by multiplying each GHG (CO2, CH4) by its Global Warming Potential (GWP) and adding them together
- (4) CO2 GWP = 1; CH4 GWP = 25; [40 CFR Part 98]

Equipment Type	Fuel	Units	Engine and Boiler Emission Factors											
			NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e
Boiler < 100 MMBtu	Natural Gas	lb/MMscf	50	84	5.5	0.6	1.9	1.9	5.7	120000	2.3	2.2	120713	0.00
Space & Water Heaters	Natural Gas	lb/MMscf	100	84	5.5	0.6	1.9	1.9	5.7	120000	2.3	2.2	120713	0.00
Engine 2 SLB	Natural Gas	lb/MMBtu	3.17	0.386	0.12	0.000568	0.0384	0.0384	0.00991	1.10	1.45	0	146	0.00
1500 KW Caterpillar Egen	Natural Gas	lb/hrp-hr	0.001102	0.004298	0.001168	4.08E-06	0.0002663	0.0002663	6.67E-05	0.98078	0.00983	0	1	0.00

Notes

- (1) NOx, CO, VOC, and PMF-10 Emission Factors for Boilers < 100 MMBtu from ETI Combustion Analysis June 2015
- (2) All other emission factors for natural gas boilers taken from AP-42 Tables 1.4-1 & 1.4-2
- (3) Emission Factors for Space & Water Heaters taken from AP-42 Tables 1.4-1 & 1.4-2
- (4) Emission Factors for 2 SLB engine taken from AP-42 Table 3.2-1
- (5) NOx, CO, VOC, CO2, and CH4 emission factors for Caterpillar Engines taken from Caterpillar Manufacturer data
- (6) SO2, PMF, PMF-10, PMF-2.5, PMC, and N2O Emission factors for Caterpillar Engines taken from AP-42 Table 3.2-1 and converted using manufacturer fuel data
- (7) Assume PMF=PMF-10=PMF-2.5
- (8) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
- (9) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR 98]

**Table N-5 Hazardous Air Pollutant (HAP) Emissions From Combustion Sources
ACP Marts Compressor Station - Lewis County, West Virginia**

Quantity @ ACP-1		Annual HAP Emissions (lb/yr)							
Pollutant	HAP?	1	1	1	1	1	1	1	1
		Solar Taurus 60 Turbine	Solar Taurus 70 Turbine	Solar Mars 100 Turbine	Solar Titan 130 Turbine	Boiler < 100 MMBtu	Boiler < 100 MMBtu	Boiler < 100 MMBtu	1500 KW Caterpillar Egen
1,1,2,2-Tetrachloroethane	Yes								0.035
1,1,2-Trichloroethane	Yes								0.028
1,1-Dichloroethane	Yes								0.021
1,2,3-Trimethylbenzene	No								0.019
1,2,4-Trimethylbenzene	No								0.059
1,2-Dichloroethane	Yes								0.023
1,2-Dichloropropane	Yes								0.024
1,3,5-Trimethylbenzene	No								0.010
1,3-Butadiene	Yes								0.438
1,3-Dichloropropene	Yes								0.023
2,2,4-Trimethylpentane	Yes								0.452
2-Methylnaphthalene	No					0.002	0.000	0.000	0.011
3-Methylchloranthrene	No					0.0002	0.0000	0.0000	
7,12-Dimethylbenz(a)anthracene	No					0.001	0.000	0.000	
Acenaphthene	No					0.0002	0.0000	0.0000	0.001
Acenaphthylene	No					0.0002	0.0000	0.0000	0.002
Acetaldehyde	Yes								4.142
Acrolein	Yes								4.153
Anthracene	No					0.0002	0.0000	0.0000	0.000
Benz(a)anthracene	No					0.0002	0.0000	0.0000	0.000
Benzene	Yes					0.193	0.009	0.004	1.036
Benzo(a)pyrene	No					0.0001	0.0000	0.0000	0.000
Benzo(b)fluoranthene	No					0.0002	0.0000	0.0000	0.000
Benzo(e)pyrene	No								0.000
Benzo(g,h,i)perylene	No					0.0001	0.0000	0.0000	0.000
Benzo(k)fluoranthene	No					0.0002	0.0000	0.0000	0.000
Biphenyl	Yes								0.002
Butane	No					192.978	9.018	3.607	2.536
Butyl/isobutyraldehyde	No								0.233
Carbon Tetrachloride	Yes								0.032
Chlorobenzene	Yes								0.024
Chloroethane	Yes								
Chloroform	Yes								0.025
Chrysene	No					0.0002	0.0000	0.0000	0.000
Cyclohexane	No								0.164
Cyclopentane	No								0.051
Dibenzo(a,h)anthracene	No					0.0001	0.0000	0.0000	
Dichlorobenzene	Yes					0.110	0.005	0.002	
Ethane	No					284.872	13.312	5.325	37.847
Ethylbenzene	Yes								0.058
Ethylene Dibromide	Yes								0.039
Fluoranthene	No					0.0003	0.0000	0.0000	0.000
Fluorene	No					0.0003	0.0000	0.0000	0.001
Formaldehyde	Yes	773.647	992.029	1483.207	1816.631	6.892	0.322	0.129	29.486
Hexane (or n-Hexane)	Yes					165.409	7.729	3.092	0.238
Indeno(1,2,3-c,d)pyrene	No					0.0002	0.0000	0.0000	0.000
Isobutane	No								2.002
Methanol	Yes								1.324
Methylcyclohexane	No								0.180
Methylene Chloride	Yes								0.078
n-Nonane	No								0.016
n-Octane	No								0.040
Naphthalene	Yes					0.056	0.003	0.001	0.051
PAH	Yes								0.072
Pentane (or n-Pentane)	No					238.925	11.165	4.466	0.817
Perylene	No								0.000
Phenanthrene	No					0.002	0.000	0.000	0.002
Phenol	Yes								0.022
Propane	No					147.031	6.871	2.748	15.320
Propylene Oxide	Yes								
Pyrene	No					0.0005	0.0000	0.0000	0.000
Styrene	Yes								0.029
Tetrachloroethane	No								
Toluene	Yes					0.312	0.015	0.006	0.514
Vinyl Chloride	Yes								0.013
Xylene	Yes								0.143
Arsenic	Yes					0.018	0.001	0.000	
Barium	No					0.404	0.019	0.008	
Beryllium	Yes					0.001	0.000	0.000	
Cadmium	Yes					0.101	0.005	0.002	
Chromium	Yes					0.129	0.006	0.002	
Cobalt	Yes					0.008	0.000	0.000	
Copper	No					0.078	0.004	0.001	
Manganese	Yes					0.035	0.002	0.001	
Mercury	Yes					0.024	0.001	0.000	
Molybdenum	No					0.101	0.005	0.002	
Nickel	Yes					0.193	0.009	0.004	
Selenium	Yes					0.002	0.000	0.000	

**Table N-5 Hazardous Air Pollutant (HAP) Emissions From Combustion Sources
ACP Marts Compressor Station - Lewis County, West Virginia**

Quantity @ ACP-1		Annual HAP Emissions (lb/yr)							
Pollutant	HAP?	1	1	1	1	1	1	1	1
		Solar Taurus 60 Turbine	Solar Taurus 70 Turbine	Solar Mars 100 Turbine	Solar Titan 130 Turbine	Boiler < 100 MMBtu	Boiler < 100 MMBtu	Boiler < 100 MMBtu	1500 KW Caterpillar Egen
Vanadium	No					0.211	0.010	0.004	
Zinc	No					2.665	0.125	0.050	
Lead	Yes					0.046	0.002	0.001	
Total HAPs		819.314	1050.586	1570.758	1923.863				
Total HAP/unit (lb/yr)		819	1051	1571	1924	174	8.11	3.24	43
Total HAP/unit (TPY)		0.410	0.525	0.785	0.962	0.0868	0.004	0.002	0.021

Hazardous Air Pollutant

Notes:

- (1) Emissions above are on a per unit basis
- (2) Calculations for the Caterpillar emergency generator assume 100 hours of operation; all other calculations assume 8,760 hours of operation
- (3) Heat rates for Solar Turbines taken from Solar Datasheets
- (4) Solar turbines have a 50% HAP control efficiency due to the Oxidation Catalyst

Table N-6 Combustion Source HAP Emission Factors
ACP Marts Compressor Station - Lewis County, West Virginia

Pollutant	HAP?	Emission Factors					
		Solar Taurus 60 Turbine	Solar Taurus 70 Turbine	Solar Mars 100 Turbine	Solar Titan 130 Turbine	Boiler < 100 MMBtu	1500 KW Caterpillar Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr
1,1,2,2-Tetrachloroethane	Yes						1.7E-07
1,1,2-Trichloroethane	Yes						1.3E-07
1,1-Dichloroethane	Yes						9.9E-08
1,2,3-Trimethylbenzene	No						9.0E-08
1,2,4-Trimethylbenzene	No						2.8E-07
1,2-Dichloroethane	Yes						1.1E-07
1,2-Dichloropropane	Yes						1.1E-07
1,3,5-Trimethylbenzene	No						4.6E-08
1,3-Butadiene	Yes						2.1E-06
1,3-Dichloropropene	Yes						1.1E-07
2,2,4-Trimethylpentane	Yes						2.2E-06
2-Methylnaphthalene	No					2.4E-05	5.4E-08
3-Methylchloranthrene	No					1.8E-06	
7,12-Dimethylbenz(a)anthracene	No					1.6E-05	
Acenaphthene	No					1.8E-06	3.4E-09
Acenaphthylene	No					1.8E-06	8.1E-09
Acetaldehyde	Yes						2.0E-05
Acrolein	Yes						2.0E-05
Anthracene	No					2.4E-06	1.8E-09
Benzo(a)anthracene	No					1.8E-06	8.5E-10
Benzene	Yes					2.1E-03	4.9E-06
Benzo(a)pyrene	No					1.2E-06	1.4E-11
Benzo(b)fluoranthene	No					1.8E-06	2.2E-11
Benzo(e)pyrene	No						6.0E-11
Benzo(g,h,i)perylene	No					1.2E-06	6.3E-11
Benzo(k)fluoranthene	No					1.8E-06	1.1E-11
Biphenyl	Yes						1.0E-08
Butane	No					2.1E+00	1.2E-05
Butyl/Isobutyraldehyde	No						1.1E-06
Carbon Tetrachloride	Yes						1.5E-07
Chlorobenzene	Yes						1.1E-07
Chloroethane	Yes						
Chloroform	Yes						1.2E-07
Chrysene	No					1.8E-06	1.7E-09
Cyclohexane	No						7.8E-07
Cyclopentane	No						2.4E-07
Dibenzo(a,h)anthracene	No					1.2E-06	
Dichlorobenzene	Yes					1.2E-03	
Ethane	No					3.1E+00	1.8E-04
Ethylbenzene	Yes						2.7E-07
Ethylene Dibromide	Yes						1.9E-07
Fluoranthene	No					3.0E-06	9.2E-10
Fluorene	No					2.8E-06	4.3E-09
Formaldehyde	Yes	2.9E-03	2.9E-03	2.9E-03	2.9E-03	7.5E-02	1.4E-04
Hexane (or n-Hexane)	Yes					1.8E+00	1.1E-06
Indeno(1,2,3-c,d)pyrene	No					1.8E-06	2.5E-11
Isobutane	No						9.5E-06
Methanol	Yes						6.3E-06
Methylcyclohexane	No						8.6E-07
Methylene Chloride	Yes						3.7E-07
n-Nonane	No						7.8E-08
n-Octane	No						1.9E-07
Naphthalene	Yes					6.1E-04	2.5E-07
PAH	Yes						3.4E-07
Pentane (or n-Pentane)	No					2.6E+00	3.9E-06
Perylene	No						1.3E-11
Phenanthrene	No					1.7E-05	9.0E-09
Phenol	Yes						1.1E-07
Propane	No					1.6E+00	7.3E-05
Propylene Oxide	Yes						
Pyrene	No					5.0E-06	1.5E-09
Styrene	Yes						1.4E-07

Table N-6 Combustion Source HAP Emission Factors
ACP Marts Compressor Station - Lewis County, West Virginia

Pollutant	HAP?	Emission Factors					
		Solar Taurus 60 Turbine	Solar Taurus 70 Turbine	Solar Mars 100 Turbine	Solar Titan 130 Turbine	Boiler < 100 MMBtu	1500 KW Caterpillar Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr
Tetrachloroethane	No						
Toluene	Yes					3.4E-03	2.5E-06
Vinyl Chloride+A32	Yes						6.3E-08
Xylene	Yes						6.8E-07
Arsenic	Yes					2.0E-04	
Barium	No					4.4E-03	
Beryllium	Yes					1.2E-05	
Cadmium	Yes					1.1E-03	
Chromium	Yes					1.4E-03	
Cobalt	Yes					8.4E-05	
Copper	No					8.5E-04	
Manganese	Yes					3.8E-04	
Mercury	Yes					2.6E-04	
Molybdenum	No					1.1E-03	
Nickel	Yes					2.1E-03	
Selenium	Yes					2.4E-05	
Vanadium	No					2.3E-03	
Zinc	No					2.9E-02	
Lead	Yes					5.0E-04	
Total Haps		3.1E-03	3.1E-03	3.1E-03	3.1E-03		

Hazardous Air Pollutant

Notes:

- (1) Emission factors for Solar and Capstone natural gas turbines from AP-42 Table 3.1-3
- (2) Emission factors for natural gas boilers from AP-42 Tables 1.4-2, 1.4-3, and 1.4-4
- (3) Emission factors for 2 SLB natural gas engines and Caterpillar natural gas emergency generators taken from AP-42 Table 3.2-1
- (4) Emission factors for Solar natural gas turbines and Caterpillar emergency generators converted using 1 KWh = 3412 Btu and 1 kw = 1.341 hp
- (5) Emission Factors (lb/MMBtu) for Formaldehyde and Total HAPs for Solar Turbines from Solar PIL 168

**Table N-7 Potential Emissions From Fugitive Leaks
ACP Marts Compressor Station - Lewis County, West Virginia**

Fugitive Emissions (FUG)

Source Designation:	FUG-02
---------------------	--------

Operational Parameters

Annual Hours of Operation (hr/yr):	8,760
------------------------------------	-------

Compressor Fugitive Emissions Rate

Equipment	Service	CH ₄ Emission Factor ^[1] ton/compr-hr	CH ₄ Weight Fraction ^[1]	
			lb/yr	230
Solar Turbine	Gas	2.67E-02	0.931	

1. Default methane leak and emission factor taken from Table 6-6 of Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry, API, August 2009.

2. Sample calculation: Hours of operation (hr/yr) * EF (ton / compressor-hr) / Methane Fraction

Pipeline Natural Gas Fugitive Emissions

Equipment	Service	Emission Factor ^[1] lb/hr/source	Source Count ^[2]	Total HC Potential Emissions lb/hr	VOC Weight Fraction	VOC Emissions tpy	CO ₂ Weight Fraction	CO ₂ Emissions tpy	CH ₄ Weight Fraction	CH ₄ Emissions tpy	HAP Weight Fraction	HAP Emissions tpy
Compressors	Gas	5.71E-01	4	228	0.026	26.2	0.0271	29.1	0.995	895	1.48E-03	1.48E+00
Pump Seals	Gas	2.40E-03	0	0.00	0.026	0.00	0.0271	0.000	0.995	0.00	1.48E-05	0.00E+00
Others (compressors and others)	Gas	8.80E-03	0	0.00	0.026	0.00	0.0271	0.000	0.975	0.00	1.48E-03	0.00E+00
Connectors	Gas	2.00E-04	3	6.00E-04	0.026	6.89E-05	0.0271	7.13E-05	0.875	2.35E-03	1.48E-03	3.89E-06
Flanges	Gas	3.90E-04	658	0.257	0.026	0.029	0.0271	0.030	0.995	1.006	1.48E-03	1.66E-03
Open-ended lines	Gas	2.00E-03	0	0.00	0.026	0.00	0.0271	0.000	0.895	0.000	1.48E-03	0.00E+00
			Total	233	0.026	26.8	0.0271	27.7	0.913	913	1.48E-03	1.51E+00

1. EPA Protocol for Equipment Leaks Emissions Estimate (EPA-453/R-95-017) Table 2-4: Oil and Gas Production Operations Emission Factors

2. Component count based on Basic Science Engineering Returns

3. Source count for fugitive emissions includes equipment from ACE-1, CDP Knutshelw M&E station, and SFP CNX M&E Station.

4. SFP CNX M&E Station source count^[3] based on Long Run M&E Station equipment counts.

Sample Calculation:

Potential Emissions (lb/hr) = Emission Factor (lb/hr/source) * Source Count

Potential Emissions (tons/yr) = (lb/hr/potential) * Hours of Operation (hr/yr) * (1 ton/2000 lb)

**Table N-8a Tank Emissions
ACP Marts Compressor Station - Lewis County, West Virginia**

Source Designation: TK-1, TK-2, TK-3

Tank Parameters

Source	Type of Tank	Contents	Capacity (gal)	Throughput gal/yr	Tank Diam. ft	Tank Length		Paint Color	Paint Condition
						ft	ft		
TK-1	Horizontal, fixed	Produced Fluids	2,500	12,500	4.61	20		Light Grey	Good
TK-2	Horizontal, fixed	Lube Oil	2,000	10,000	4.12	10		Light Grey	Good

Total Emissions

Source	VOC Emissions						Total Losses
	Flashing Losses		Working Losses		Breathing Losses		
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
TK-1 ^[1]	--	--	--	--	--	--	0.350
TK-2 ^[2]	NA	NA	1.03E-06	4.50E-06	2.98E-06	1.31E-05	1.76E-05

1. Losses were calculated for TK-1 using E&P Tanks Software. See attached for output.
2. Losses were calculated for TK-2 using EPA's TANKS 4.09d software with default breather vent settings.
3. Losses (Emissions) from TK-3 8,000-gallon Ammonia tank assumed to be insignificant.

**Table N-8b Pipeline to Truck Liquid Loading Rack Emissions
ACP Marts Compressor Station - Lewis County, West Virginia**

Source Designation:	LR-1
---------------------	------

Chemical Parameters

Chemical	Vapor Mol. Weight ^[1] (lb/lb-mol)	Avg. Vapor Pressure ^[1] (psia)	Avg. Temperature ^[2] (deg. R)	Saturation Factor ^[3]	Throughput ^[4] Mgal/yr
Pipeline Liquids	43.86	7.70	520	0.6	12.50

References:

1. Vapor molecular weight and vapor pressure based on E&P output for Pipeline Liquids Storage Tank TK-1.
2. Based on average ambient temperature data for the area.
3. Saturation Factor based on "Submerged loading: dedicated normal service" in Table 5.2-1 of AP-42, Ch. 5.2.

Total Potential Emissions

Source	Total Loading Losses ^[1]		Pump Capacity ^[2] (gal/min)	Max Hourly Losses lb/hr
	Average (lbs/Mgal)	Annual (tpy)		
Pipeline Liquids Truck Loading	4.86	0.03	90	26.2

References:

1. AP-42, Ch. 5.2, Equation 1 (Loading Loss = 12.46 x (Saturation Factor x TVP x Molecular Weight) / Temp.)
2. Assumed pump rate.

Speciated Potential Emissions

Source	Contents	VOC Weight Fraction ^[1] (%)	HAP Weight Fraction ^[1] (%)	Total VOC Emissions		Total HAP Emissions	
				lb/hr	tpy	lb/hr	tpy
Pipeline Liquids Truck Loading	Pipeline Liquids	20%	0.002%	5.25	0.006	4.98E-04	5.77E-07

References:

1. VOC and HAP weight fractions are based on 118-PP-04 tank emissions speciation.

Table N-9 Project Potential Emissions
 ACP Marts Compressor Station - Lewis County, West Virginia

Combustion Sources	ID	Criteria Pollutants (tpy)										GHG Emissions (tpy)					Ammonia (tpy) NHS	HAP (tpy) Total HAP
		NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PM10	CO2	CH4	N2O	CO2e					
Solar Titan 130 Turbine	CT-01	15.0	27.8	1.43	2.58	4.36	4.36	4.36	10.8	90,198	7.40	2.27	91,059	10.2	0.962			
Solar Mars 100 Turbine	CT-02	12.3	20.7	1.14	2.12	3.60	3.60	3.60	8.90	74,385	6.00	1.87	75,094	8.12	0.785			
Solar Taurus 70 Turbine	CT-03	8.35	13.1	0.775	1.43	2.42	2.42	2.42	5.99	50,035	4.00	1.26	50,511	5.77	0.525			
Solar Taurus 60 Turbine	CT-04	6.28	8.46	0.561	1.08	1.83	1.83	1.83	4.53	37,843	2.96	0.954	38,201	4.29	0.410			
Caterpillar G3516C Egen	EG-01	0.116	0.451	0.123	0.0004	0.0279	0.0279	0.0279	0.007	103	1.03	0	129	0.00	0.0213			
Boiler	WH-01	2.30	3.86	0.253	0.0276	0.0873	0.0873	0.0873	0.262	5,514	0.106	0.101	5,546	0.00	0.0868			
Fugitive Leaks - Blowdowns	FUG-01	-	-	24.7	-	-	-	-	25.6	844	-	-	21,124	-	1.40			
Fugitive Leaks - Piping	FUG-02	-	-	26.8	-	-	-	-	27.7	913	-	-	22,856	-	1.51			
Accumulator Tank	TK-1	-	-	0.350	-	-	-	-	-	-	-	-	-	-	-			
Hydrocarbon (Waste Oil) Tank	TK-2	-	-	1.76E-05	-	-	-	-	-	-	-	-	-	-	-			
Truck Loading Rack	LR-01	-	-	0.006	-	-	-	-	-	-	-	-	-	-	-			
Total (tons/yr)		44.4	74.4	56.1	7.24	12.3	12.3	12.3	30.5	258,130	1,779	6.46	304,519	28.4	5.77E-07			

TK-1 Produced Fluids Tank 081015.txt

```

*****
* Project Setup Information
*
Project File : M:\Projects\D\Dominion\Atlantic Coastal Pipeline and Supply Header
Pipeline\Draft Rule 13 - APCI\Emission Calc\TK-1 - Produced Fluids Tank.ept
Flowsheet Selection : Oil Tank with separator
Calculation Method : AP42
Control Efficiency : 100.0%
Known separator Stream : Low Pressure Gas
Entering Air Composition : No

```

Date : 2015.07.13

```

*****
* Data Input
*****

```

```

Separator Pressure : 552.00[psig]
Separator Temperature : 77.00[F]
Molar GOR : 0.0500
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG : 0.8990
C10+ MW : 166.00

```

```

-- Low Pressure Gas -----

```

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	1.0410
4	N2	0.9940
5	C1	94.2060
6	C2	2.9230
7	C3	0.5460
8	i-C4	0.0790
9	n-C4	0.0840
10	i-C5	0.0240
11	n-C5	0.0220
12	C6	0.0320
13	C7+	0.0490
14	Benzene	0.0000
15	Toluene	0.0000
16	E-Benzene	0.0000
17	Xylenes	0.0000
18	n-C6	0.0000
19	224Trimethylp	0.0000

TK-1 Produced Fluids Tank 081015.txt

C7+ Molar Ratio: C7 : C8 : C9 : C10+
 1.0000 1.0000 1.0000 1.0000

 -- Sales Oil ---
 Production Rate : 0.8[bb1/day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 46.0
 Reid Vapor Pressure : 7.70[psia]
 Bulk Temperature : 80.00[F]

 -- Tank and Shell Data ---
 Diameter : 5.08[ft]
 Shell Height : 11.90[ft]
 Cone Roof Slope : 0.06
 Average Liquid Height : 2.50[ft]
 Vent Pressure Range : 0.06[psi]
 Solar Absorbance : 0.54

 -- Meteorological Data ---
 Page 1----- E&P TANK
 City : Charleston, WV
 Ambient Pressure : 14.70[psia]
 Ambient Temperature : 70.00[F]
 Min Ambient Temperature : 44.00[F]
 Max Ambient Temperature : 65.50[F]
 Total Solar Insolation : 1123.00[Btu/ft^2*day]

 * Calculation Results *****

 -- Emission Summary ---
 Item Uncontrolled Uncontrolled
 [ton/yr] [lb/hr]
 Total HAPS 0.010 0.002
 Total HC 0.425 0.097
 VOCs, C2+ 0.383 0.087
 VOCs, C3+ 0.350 0.080

Uncontrolled Recovery Info.
 Vapor 21.2300 x1E-3 [MSCFD]
 HC Vapor 19.9800 x1E-3 [MSCFD]
 GOR 26.05 [SCF/bbl]

 -- Emission Composition ---
 No Component Uncontrolled Uncontrolled

TK-1 Produced Fluids Tank 081015.txt

[ton/yr]

[lb/hr]

1	H2S	0.002
2	O2	0.000
3	CO2	0.000
4	N2	0.005
5	C1	0.001
6	C2	0.043
7	C3	0.032
8	i-C4	0.083
9	n-C4	0.033
10	i-C5	0.102
11	n-C5	0.039
12	C6	0.047
13	C7	0.015
14	C8	0.014
15	C9	0.006
16	C10+	0.001
17	Benzene	0.000
18	Toluene	0.001
19	E-Benzene	0.000
20	Xylenes	0.000
21	n-C6	0.000
22	2,2,4-Trimethylp	0.002
	Total	0.451

No. Component	MW	LP Oil mol %	Flash Oil mol %	sale Oil mol %	Flash Gas mol %	w&S Gas mol %	Total Emissions mol %
1	H2S	34.80	0.0349	0.0030	0.6834	0.1835	0.5755
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.2437	0.0000	6.3467	0.0001	4.9770
4	N2	28.01	0.0102	0.0000	0.3990	0.0001	0.3129
5	C1	16.04	0.9543	0.0000	33.1362	0.0001	25.9849
6	C2	30.07	0.6701	0.0000	13.3133	0.0001	10.4401
7	C3	44.10	2.1827	0.4600	18.8508	16.8782	18.4251
8	i-C4	58.12	1.1269	0.6191	4.3934	9.6293	5.5234
9	n-C4	58.12	4.6091	3.1320	12.5490	33.6645	17.1061
10	i-C5	72.15	3.1066	2.8099	3.3810	11.9899	5.2389
11	n-C5	72.15	5.0558	4.8107	4.0000	14.9972	6.3734
12	C6	86.16	4.1726	4.3657	1.0044	4.1822	1.6902
13	C7	100.20	10.3655	11.1500	0.8388	3.6780	1.4516
	Page 2					E&P TANK	
14	C8	114.23	10.8426	11.1074	0.2806	1.2761	0.4954
15	C9	128.28	5.5127	5.6497	0.0497	0.2328	0.0892
16	C10+	166.00	45.9695	47.1217	0.0099	0.0486	0.0182
17	Benzene	78.11	0.5685	0.5808	0.0778	0.3297	0.1322
18	Toluene	92.13	0.2132	0.2183	0.0082	0.0362	0.0142
19	E-Benzene	106.17	0.0711	0.0729	0.0009	0.0041	0.0016

20	Xylenes	106.17	TK-1 Produced Fluids	0.6802	0.6971	0.7408	081015.txt	0.0075	0.0344	0.0133
21	n-C6	86.18		3.5939	3.6672	3.7955		0.6694	2.8351	1.1368
22	224Trimethylp	114.24		0.0000	0.0000	0.0000		0.0000	0.0000	0.0000
	MW			123.89	126.03	129.50		38.64	63.78	44.07
	Stream Mole Ratio			1.0000	0.9755	0.9688		0.0245	0.0067	0.0312
	Heating Value							2044.13	3547.91	2368.67
	Gas Gravity	[BTU/SCF]						1.33	2.20	1.52
	Bubble Pt. @ 100F	[Gas/Air]		56.28	19.66	6.19				
	RVP @ 100F	[psia]		126.75	78.89	38.81				
	Spec. Gravity @ 100F	[psia]		0.800	0.803	0.810				

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	TK-2
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Used Oil Aboveground Storage Tank

Tank Dimensions

Shell Length (ft):	20.06
Diameter (ft):	4.12
Volume (gallons):	2,000.00
Turnovers:	5.00
Net Throughput(gal/yr):	10,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

TK-2 - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Used Oil	All	61.57	52.97	70.18	57.22	0.0001	0.0001	0.0001	380.0000			200.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

TK-2 - Horizontal Tank

Annual Emission Calculations	
Standing Losses (lb):	0.3261
Vapor Space Volume (cu ft):	170.3396
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0818
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	170.3396
Tank Diameter (ft):	4.1200
Effective Diameter (ft):	10.2608
Vapor Space Outage (ft):	2.0600
Tank Shell Length (ft):	20.0600
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	360.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	521.2427
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.8933
Tank Paint Solar Absorptance (Shell):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5728
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0818
Daily Vapor Temperature Range (deg. R):	34.4127
Daily Vapor Pressure Range (psia):	0.3000
Breather Vent Press. Setting Range (psia):	0.3600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	521.2427
Daily Min. Liquid Surface Temp. (deg R):	512.8369
Daily Max. Liquid Surface Temp. (deg R):	529.9458
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	2.0600
Working Losses (lb)	
Working Losses (lb):	0.0090
Vapor Molecular Weight (lb/lb-mole):	360.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Annual Net Throughput (gal/yr.):	10,000.0000
Annual Turnovers:	5.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.1200
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0352

**TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals**

Emissions Report for: Annual

TK-2 - Horizontal Tank

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Used Oil	0.01	0.03	0.04

Solar Turbines Emissions Estimates

Titan 130-20502S

Assumptions: pipeline natural gas, sea level, 4" inlet/outlet losses, nominal performance

50% load																
Temp. F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	10883	90.71	30.53	9	3.2	25	5.5	25	3.2	2.5	0.3	1.1896	0.02	2.0	704	334,570
59	10005	105.64	24.10	9	3.8	25	6.4	25	3.7	2.5	0.4	1.3738	0.02	2.3	992	312,106
100	3135	96.16	21.52	9	3.4	25	5.7	25	3.3	2.5	0.3	1.2273	0.02	2.1	1051	272535
75% load																
Temp. F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	16324	137.74	30.15	9	5.0	25	8.4	25	4.8	2.5	0.5	1.8019	0.02	3.0	899	412,957
59	15007	124.31	30.72	9	4.4	25	7.5	25	4.3	2.5	0.4	1.6161	0.02	2.7	955	357,451
100	12202	109.82	28.27	9	3.8	25	6.5	25	3.7	2.5	0.4	1.4013	0.02	2.4	1019	303557
100% load																
Temp. F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	21765	157.33	35.20	9	5.7	25	9.6	25	5.5	2.5	0.6	2.0565	0.02	3.5	900	437,973
59	20010	142.45	35.74	9	5.1	25	8.6	25	4.9	2.5	0.5	1.8511	0.02	3.1	944	392,270
100	16289	125.42	33.01	9	4.4	25	7.5	25	4.3	2.5	0.4	1.6001	0.02	2.8	994	339519

Solar Turbines Emissions Estimates

Mars 100-16000S

Assumptions: pipeline natural gas, sea level, 4"/4" inlet/outlet losses, nominal performance

80% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	8787	73.11	30.58	9	2.6	25	4.4	25	2.5	2.5	0.3	9609	0.02	1.6	650	298,129
59	7760	85.24	23.16	9	3.1	25	5.2	25	3	2.5	0.3	11107	0.02	1.9	949	275,560
100	6580	75.95	22.05	9	2.7	25	4.5	25	2.6	2.5	0.3	9713	0.02	1.7	1009	240842
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	13180	115.67	28.99	9	4.2	25	7.1	25	4.0	2.5	0.4	15149	0.02	2.5	870	355,319
59	11640	101.99	29.04	9	3.7	25	6.2	25	3.5	2.5	0.4	13290	0.02	2.2	916	310,038
100	9670	90.11	27.87	9	3.2	25	5.4	25	3.1	2.5	0.3	11519	0.02	2.0	965	271481
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	17574	129.64	34.49	9	4.7	25	7.9	25	4.5	2.5	0.5	16563	0.02	2.9	864	366,922
59	15519	116.41	33.92	9	4.2	25	8.6	25	4.9	2.5	0.5	15148	0.02	2.6	908	334,207
100	13160	104.09	32.17	9	3.7	25	6.2	25	3.6	2.5	0.4	13299	0.02	2.3	945	298619

Solar Turbines Emissions Estimates

Taurus 70-10802S

Assumptions: pipeline natural gas, sea level, 4" / 4" inlet/outlet losses, nominal performance

80% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	5941	63.54	23.79	9	2.3	25	3.9	25	2.2	2.5	0.2	8321	0.02	1.4	910	199,373
59	5430	56.92	24.27	9	2.0	25	3.4	25	2.0	2.5	0.2	7407	0.02	1.3	981	170,275
100	4341	49.58	22.28	9	1.7	25	3.0	25	1.7	2.5	0.2	6336	0.02	1.1	1045	149,576
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	8912	76.91	29.49	9	2.8	25	4.7	25	2.7	2.5	0.3	10063	0.02	1.7	898	224,735
59	8145	68.47	30.27	9	2.5	25	4.2	25	2.4	2.5	0.2	8905	0.02	1.5	957	194,658
100	6512	59.08	28.05	9	2.1	25	3.5	25	2.0	2.5	0.2	7544	0.02	1.3	1019	168,855
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	11882	87.27	34.64	9	3.2	25	5.3	25	3.1	2.5	0.3	11411	0.02	1.9	864	366,922
59	10860	79.24	34.87	9	2.8	25	4.8	25	2.8	2.5	0.3	10301	0.02	1.7	908	334,207
100	8683	68.40	32.30	9	2.4	25	4.1	25	2.3	2.5	0.2	8730	0.02	1.5	945	298,619

Solar Turbines Emissions Estimates

Taurus 60-7800S

Assumptions: pipeline natural gas, sea level, 4"/4" inlet/outlet losses, nominal performance

50% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	4207	49.41	21.67	9	1.8	25	3.0	25	1.7	2.5	0.2	6478	0.02	1.1	876	166,972
59	3750	44.11	21.63	9	1.6	25	2.7	25	1.5	2.5	0.2	5748	0.02	1.0	950	144,301
100	3121	39.61	20.05	9	1.4	25	2.4	25	1.4	2.5	0.1	5067	0.02	0.9	999	128111
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	6311	58.62	27.39	9	2.1	25	3.6	25	2.1	2.5	0.2	7678	0.02	1.3	883	180,945
59	5625	51.92	27.56	9	1.9	25	3.2	25	1.8	2.5	0.2	6761	0.02	1.1	937	158,403
100	4682	46.07	25.86	9	1.8	25	2.7	25	1.6	2.5	0.2	5889	0.02	1.0	984	139855
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 (lb/hr)	PM10/2.5 (lb/mmbtu)	PM10/2.5 (lb/hr)	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	8414	65.97	32.45	9	2.4	25	4.0	25	2.3	2.5	0.2	8633	0.02	1.5	889	186,881
59	7500	60.58	31.5	9	2.2	25	3.7	25	2.1	2.5	0.2	7881	0.02	1.3	956	169,979
100	6242	53.78	29.53	9	1.9	25	3.2	25	1.8	2.5	0.2	6870	0.02	1.2	999	151663

SoLoNOx Products: Emissions in Non-SoLoNOx Modes

Leslie Witherspoon

Solar Turbines Incorporated

PURPOSE

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

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

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

COLD AMBIENT EMISSIONS ESTIMATES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

COLD AMBIENT PERMITTING STRATEGY

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

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

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

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

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

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

EMISSIONS ESTIMATES IN NON-SOLONOX MODE (LOW LOAD)

At operating loads < 50% (<40% load for the *Titan 250*) on natural gas fuel and < 65% (< 80% load for *Centaur 40*) on liquid fuels, SoLoNOx engines are controlled to increase stability and transient response capability. The control steps that are required affect emissions in two ways: 1) pilot fuel flow is increased, increasing 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% O₂ 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

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

Caterpillar is a registered trademark of Caterpillar Inc.
Solar, Titan, Mercury, Mars, Centaur and *SoLoNOx* are trademarks of Solar Turbines Incorporated. Specifications subject to change without notice. Printed in U.S.A.

Volatile Organic Compound, Sulfur Dioxide, and Formaldehyde Emission Estimates

Leslie Witherspoon
Solar Turbines Incorporated

PURPOSE

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

INTRODUCTION

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

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

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

Volatile Organic Compounds

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

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

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

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

Sulfur Dioxide

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

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

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

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

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

Formaldehyde

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

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

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

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

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

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

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

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

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

Caterpillar is a registered trademark of Caterpillar Inc.
Solar is a trademark of Solar Turbines Incorporated. Specifications subject to change without notice.
Printed in U.S.A. © 2008 Solar Turbines Incorporated. All rights reserved.

Emission Estimates at Start-up, Shutdown, and Commissioning for SoLoNO_x 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 *SoLoNO_x*[™] 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 *SoLoNO_x* combustion mode, takes three steps:

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

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

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

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

Caterpillar is a registered trademark of Caterpillar Inc.
Solar, *Titan*, *Mars*, *Taurus*, *Mercury*, *Centaur*, *Saturn*, *SoLoNOx*, and *Turbotronic* are trademarks of Solar Turbines Incorporated. All other trademarks are the intellectual property of their respective companies. Specifications are subject to change without notice.

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 1. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set Applications
10 Minute Start-up and 10 Minute Shutdown
Natural Gas Fuel**

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S				Taurus 65 8401S							
	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)	0.6	58.1	3.3	359	0.8	75.0	4.3	454	0.8	78.5	4.5	482	0.9	85.8	4.9	523				
Total Emissions per Shutdown (lbs)	0.3	25.5	1.5	160	0.4	31.1	1.8	194	0.4	34.7	2.0	217	0.4	38.2	2.2	237				
	Taurus 70 10801S				Mars 90 13002S GSC				Mars 100 16002S GSC				Titan 130 20501S				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)	1.1	103.9	5.9	634	1.4	129.0	7.4	868	1.6	151.2	8.6	952	2.1	195.6	11.2	1,194	2.5	22.7	1.5	1,925
Total Emissions per Shutdown (lbs)	1.3	110.7	6.3	689	1.7	147.9	8.4	912	1.9	166.8	9.5	1,026	2.4	210.0	12.0	1,303	3.0	19.9	1.5	1,993

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.

**Table 2. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set Applications
60 Minute Start-up and 30 Minute Shutdown
Natural Gas Fuel**

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S				Taurus 65 8401S			
	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)	4.1	219.4	13.0	3,420	5.0	272.4	16.1	4,219	5.7	299.8	17.8	4,780	6.1	326.5	19.3	5,074
Total Emissions per Shutdown (lbs)	1.8	121.1	7.1	1,442	2.3	163.3	9.5	1,834	2.5	163.5	9.6	1,994	2.6	177.2	10.4	2,119

	Taurus 70 10801S				Mars 90 13002S				Mars 100 15002S				Titan 130 20501S				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)	7.6	410.3	24.2	6,164	10.5	570.8	33.7	8,641	11.3	583.5	34.6	9,691	13.8	740.4	43.8	11,495	14.6	75.5	7.3	16,253
Total Emissions per Shutdown (lbs)	3.3	223.0	13.0	2,588	4.3	277.0	16.2	3,685	4.8	308.1	18.0	4,056	6.2	405.3	23.7	4,826	6.2	52.6	4.1	7,222

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.

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

Data will NOT be warranted under any circumstances

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

	Taurus 70 10302S				Mera 90 13002S CSMD				Mera 100-16002S CSMD				Titan 130 20502S				Titan 250 30002S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.8	73.1	4.2	519	1.2	109.3	6.2	895	1.4	123.5	7.1	829	1.9	176.9	10.1	1,161	2.6	26.2	1.7	1,794
Total Emissions per Shutdown (lbs)	1.1	93.4	5.3	575	1.5	132.6	7.6	817	1.7	149.2	8.5	920	2.4	207.6	11.9	1,272	2.9	19.1	1.4	1,918

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

**Table 4. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set
10 Minute Start-up and 10 Minute Shutdown
Liquid Fuel (Diesel #2)**

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S			
	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)	1.3	44.5	7.4	473	1.7	59.0	9.8	601	1.7	59.8	9.9	636
Total Emissions per Shutdown (lbs)	0.6	17.3	2.8	211	0.7	21.2	3.4	256	0.8	23.5	3.8	286

	Taurus 70 10801S				Mars 100 16002S GSC				Titan 130 20501S			
	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)	2.3	78.5	13.0	823	3.4	114.1	18.8	1,239	4.3	147.5	24.4	1,547
Total Emissions per Shutdown (lbs)	2.5	73.6	12.0	889	3.8	111.4	18.1	1,331	4.7	139.1	22.6	1,677

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes #2 Diesel fuel; ES 9-98 compliant.

**Table 5. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set
60 Minute Start-up and 30 Minute Shutdown
Liquid Fuel (Diesel #2)**

Data will NOT be warranted under any circumstances

	Centaur 40 4701S			Centaur 50 6201S			Taurus 60 7901S		
	NOx (lbs)	CO (lbs)	UHC (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)
Total Emissions per Start (lbs)	11.7	194.7	30.9	15.2	271.9	43.3	14.7	282.6	45.0
Total Emissions per Start (lbs)									
Total Emissions per Shutdown (lbs)									
	4.4	84.7	13.6	6.7	164.3	27.0	6.3	159.0	26.0
Total Emissions per Shutdown (lbs)									
	18.4	360.3	57.4	29.1	552.0	87.7	34.4	677.0	108.0
Total Emissions per Start (lbs)									
Total Emissions per Shutdown (lbs)									
	8.0	207.8	34.1	12.3	302.6	49.4	15.0	388.5	63.7
Total Emissions per Start (lbs)									
Total Emissions per Shutdown (lbs)									
	18.4	360.3	57.4	29.1	552.0	87.7	34.4	677.0	108.0
Total Emissions per Start (lbs)									
Total Emissions per Shutdown (lbs)									
	8.0	207.8	34.1	12.3	302.6	49.4	15.0	388.5	63.7
Total Emissions per Start (lbs)									
Total Emissions per Shutdown (lbs)									

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes #2 Diesel fuel; ES 9-98 compliant.

SCR CATALYST DESIGN DATASHEET

ENQUIRY DETAILS	
Enquiry Number	32237
Revision	0
Date of Revision	26-May-2015
Project Name	Atlantic Coast Pipelines
Project Location	Marib
Application	Simple Cycle
Number of SCRs	17

PROCESS DATA		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12
Customer Design Case		Centaur 40	Centaur 40	Centaur 50L	Centaur 50L	Taurus 60	Taurus 60	Taurus 70	Taurus 70	Mars 100	Mars 100	Titan 130	Titan 130
Percent Fuel Case	Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EXHAUST GAS EMISSIONS DATA (BEFORE COOLING)													
Exhaust Gas Mass Flowrate, Wet	lb/h	184994	137403	181184	127484	185580	151704	247255	179624	367228	289445	437956	341226
Exhaust Gas Volumetric Flowrate, Wet	ACFM	87269	73508	91761	80871	107807	90852	139492	112383	207193	177363	254953	215260
Exhaust Gas Temperature	degrees F	779.0	873.0	871.0	1004.0	838.0	959.0	858.0	980.0	859.0	953.0	900.0	933.0
Exhaust Gas Composition													
Component	MW												
O2	31.999	vol% (wet)	15.78	15.29	14.80	14.09	14.50	13.30	14.39	13.50	14.73	14.23	14.40
H2O	18.015	vol% (wet)	4.67	6.15	5.55	9.21	5.81	9.34	5.91	9.39	5.61	9.08	5.90
N2	28.013	vol% (wet)	76.23	73.41	75.88	73.01	75.78	72.95	75.74	72.93	75.65	73.06	75.75
CO2	44.010	vol% (wet)	2.41	2.27	2.86	2.83	3.00	2.90	3.05	2.93	2.90	2.76	3.04
Ar	38.948	vol% (wet)	0.91	0.88	0.91	0.87	0.91	0.87	0.91	0.67	0.91	0.87	0.91
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source @ %O2		15											
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	25.00	25.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Nox as NO2	lb/h	4.66	3.44	1.95	1.55	2.38	1.89	3.20	2.26	4.51	3.44	5.66	4.43
CO	ppmvd	50.00	50.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
CO	lb/h	5.67	4.19	3.31	2.63	3.02	3.20	3.42	3.83	3.52	5.81	9.58	7.49
SO2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COOLING AIR DATA													
Cooling Air Mass Flowrate, Wet	lb/h	7181.2	27900.1	29270.8	57444.8	38705.3	67013.0	30077.2	23373.3	60074.6	104237.6	98593.9	147062.4
Cooling Air Volumetric Flowrate, Wet	ACFM	1387	6438	5953	13303	7475	15516	7739	46991	11991	24138	19040	34064
Ambient Air Temperature	degrees F	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
Relative Humidity	Percent	80.00	80.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
EXHAUST GAS EMISSIONS DATA (AFTER COOLING)													
Exhaust Gas Mass Flowrate, Wet	lb/h	172175	165203	190455	184828	225585	218717	287332	253197	427303	393683	536550	463325
Exhaust Gas Volumetric Flowrate, Wet	ACFM	85398	80938	98394	86282	115559	113070	148553	131945	220765	205195	277243	254464
Exhaust Gas Temperature (after cooling)	degrees F	750.00	758.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
Exhaust Gas Composition													
Component	MW												
O2	31.999	vol% (wet)	15.89	16.15	15.73	15.95	15.59	15.82	15.29	15.68	15.59	15.78	15.59
H2O	18.015	vol% (wet)	4.48	7.38	4.72	7.55	4.84	7.87	5.11	7.79	4.84	7.70	4.84
N2	28.013	vol% (wet)	78.30	73.71	78.21	73.65	76.16	73.61	76.05	76.15	73.59	76.16	73.54
CO2	44.010	vol% (wet)	2.31	1.87	2.43	1.97	2.50	2.63	2.10	2.30	2.04	2.49	2.12
Ar	38.948	vol% (wet)	0.91	0.88	0.91	0.88	0.91	0.88	0.91	0.88	0.91	0.88	0.91
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source @ %O2		15											
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	25.00	25.06	9.00	9.04	9.00	9.04	9.00	9.04	9.00	9.03	9.00	9.04
Nox as NO2	lb/h	4.66	3.44	1.95	1.55	2.38	1.89	3.20	2.26	4.51	3.44	5.66	4.43
CO	ppmvd	50.00	50.13	25.00	25.11	25.00	25.11	25.00	25.10	25.00	25.09	25.00	25.11
CO	lb/h	5.67	4.19	3.31	2.63	3.02	3.20	3.42	3.83	3.52	5.81	9.58	7.49
SO2	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3	lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Particulates	kg/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trace Elements	mg/Nm3 (dry)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amount of Nox as NO2	Percent	50	50	50	50	50	50	50	50	50	50	50	50
Nox Reduction	Percent	80.00	80.00	44.44	44.44	44.44	44.44	44.44	44.44	44.44	44.44	44.44	44.44
Dilution Air Required	SCFM	327	327	327	327	327	327	327	327	327	327	327	327
Aqueous Ammonia Requirement	lb/h	11	8	8	5	7	5	10	7	14	10	17	13
Aqueous Ammonia Requirement	gal/month	1046	772	569	452	682	351	932	659	1311	1000	1549	1289
Total Mass Injected by SCR	lb/h	338	335	333	332	334	333	337	334	341	337	344	340
Exhaust Gas Mass Flowrate, Wet at SCR catalyst	lb/h	172513.1	16638.2	190787.8	185290.8	225619.5	219499.7	271668.9	253531.1	427643.2	394020.0	536894.1	488665.8
Exhaust Gas Vol Flowrate, Wet at SCR Catalyst	ACFM	89079	81113	98556	85465	116732	114080	148727	132119	220962	205371	277421	254642
Performance Warranties @ %O2		15											
Reference applicable for ppmvd and mg/Nm3 (dry)													
Nox as NO2	ppmvd	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Nox as NO2	lb/h	0.93	0.89	1.09	0.86	1.32	1.05	1.78	1.26	2.50	1.91	3.15	2.46
NH3 Slip	ppmvd	10.00	10.03	10.00	10.04	10.00	10.04	10.00	10.04	10.00	10.04	10.00	10.04
NH3 Slip	lb/h	0.65	0.51	0.80	0.84	0.98	0.78	1.32	0.93	1.85	1.41	2.33	1.82
%COU Selected		AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15	AOEL 15
SO2 to SO3 Conversion	Percent	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA
Pressure Drop across the catalyst	inH2O	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA	VTA

* VTA = Vendor to Advise

SITE/AMBIENT CONDITIONS		
Design Ambient Temperature	100	degrees F
Design Ambient Pressure	407	inH2O
Site Elevation	1500	ft
Gauge Dual Pressure	20.00	inH2O
Relative Humidity	60	Percent

ANALYSIS	
Reagent	Aqueous Ammonia
Reagent Concentration	18.00 %w/w

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	11.3:1	APPLICATION:	GenSet
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	STANDBY
AFTERCOOLER - STAGE 2 INLET (°F):	130	FUEL:	Nat Gas
AFTERCOOLER - STAGE 1 INLET (°F):	198	FUEL SYSTEM:	CAT LOW PRESSURE
JACKET WATER OUTLET (°F):	210		WITH AIR FUEL RATIO CONTROL
ASPIRATION:	TA	FUEL PRESSURE RANGE (psig):	0.5-5.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	80
CONTROL SYSTEM:	ADEM3 W IM	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE CAPABILITY AT 77°F INLET AIR TEMP. (ft):	6000
COMBUSTION:	Low Emission	POWER FACTOR:	0.8
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	VOLTAGE(V):	400-480

RATING		NOTES	LOAD	100%	75%	50%
GENSET POWER	(WITHOUT FAN)	(1)(2)	ekW	1500	1125	750
GENSET POWER		(1)(2)	kVA	1875	1406	937
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2098	1578	1085
GENERATOR EFFICIENCY		(1)	%	95.9	95.6	94.4
GENSET EFFICIENCY (@ 1.0 Power Factor)	(ISO 3046/1)	(3)	%	36.3	35.2	32.3
THERMAL EFFICIENCY		(4)	%	48.9	49.5	51.8
TOTAL EFFICIENCY (@ 1.0 Power Factor)		(5)	%	85.2	84.7	84.1

ENGINE DATA						
GENSET FUEL CONSUMPTION	(ISO 3046/1)	(6)	Btu/ekW-hr	9467	9751	10629
GENSET FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/ekW-hr	9698	9989	10888
ENGINE FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/bhp-hr	6335	7121	7664
AIR FLOW (77°F, 14.7 psia)	(WET)	(7)	ft ³ /min	4477	3515	2516
AIR FLOW	(WET)	(7)	lb/hr	19853	15587	11156
FUEL FLOW (60°F, 14.7 psia)			scfm	268	207	150
COMPRESSOR OUT PRESSURE			in Hg(abs)	95.2	78.5	60.7
COMPRESSOR OUT TEMPERATURE			°F	416	355	284
AFTERCOOLER AIR OUT TEMPERATURE			°F	138	134	129
INLET MAN. PRESSURE		(8)	in Hg(abs)	81.9	64.8	46.6
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	139	137	138
TIMING		(10)	°BTDC	28	28	28
EXHAUST TEMPERATURE - ENGINE OUTLET		(11)	°F	873	908	932
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(12)	ft ³ /min	11988	9653	7035
EXHAUST GAS MASS FLOW	(WET)	(12)	lb/hr	20585	16153	11567
MAX INLET RESTRICTION		(13)	in H ₂ O	10.04	10.04	10.04
MAX EXHAUST RESTRICTION		(13)	in H ₂ O	20.07	20.07	20.07

EMISSIONS DATA - ENGINE OUT						
NOx (as NO ₂)		(14)(15)	g/bhp-hr	0.50	0.50	0.50
CO		(14)(16)	g/bhp-hr	1.95	2.04	2.06
THC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	5.25	6.21	7.03
NMHC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	0.79	0.93	1.05
NMNEHC (VOCs) (mol. wt. of 15.84)		(14)(16)(17)	g/bhp-hr	0.53	0.62	0.70
HCHO (Formaldehyde)		(14)(16)	g/bhp-hr	0.52	0.52	0.61
CO ₂		(14)(16)	g/bhp-hr	445	490	518
EXHAUST OXYGEN		(14)(18)	% DRY	9.4	9.2	9.1
LAMBDA		(14)(18)		1.70	1.72	1.70

ENERGY BALANCE DATA						
LHV INPUT		(19)	Btu/min	242453	187291	136100
HEAT REJECTION TO JACKET WATER (JW)		(20)(28)	Btu/min	34325	26067	24171
HEAT REJECTION TO ATMOSPHERE		(21)	Btu/min	7856	6559	5280
HEAT REJECTION TO LUBE OIL (OC)		(22)(28)	Btu/min	6183	5514	4704
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(23)(24)	Btu/min	78811	65120	48226
HEAT REJECTION TO EXHAUST (LHV TO 248°F)		(23)	Btu/min	57518	47746	35501
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(25)(28)	Btu/min	16058	9070	2712
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(26)(29)	Btu/min	8305	6074	3860
PUMP POWER		(27)	Btu/min	1964	1964	1964

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	30	35	40	45	50	55	60	65	70	75	80	100
SET POINT TIMING	-	-	-	-	-	20	22	24	28	28	28	28
DERATION FACTOR	0	0	0	0	0	0.90	0.91	0.93	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	130	1	1	0.97	0.94	0.90	0.86	0.83	0.79	0.75	0.70	0.65	0.60	0.55	
	120	1	1	1	0.98	0.94	0.90	0.86	0.83	0.79	0.75	0.70	0.65	0.59	
	110	1	1	1	1	0.98	0.94	0.90	0.86	0.83	0.79	0.75	0.69	0.64	
	100	1	1	1	1	1	0.98	0.94	0.90	0.86	0.82	0.79	0.75	0.68	
	90	1	1	1	1	1	1	0.96	0.93	0.89	0.85	0.82	0.78	0.74	
	80	1	1	1	1	1	1	0.99	0.95	0.91	0.87	0.83	0.79	0.75	
	70	1	1	1	1	1	1	1	0.96	0.92	0.88	0.84	0.80	0.75	
	60	1	1	1	1	1	1	1	0.96	0.92	0.88	0.84	0.80	0.75	
	50	1	1	1	1	1	1	1	0.96	0.92	0.88	0.84	0.80	0.75	
			0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	130	1.29	1.33	1.38	1.44	1.49	1.54	1.59	1.59	1.59	1.59	1.59	1.59	1.59	
	120	1.23	1.28	1.32	1.37	1.43	1.48	1.53	1.53	1.53	1.53	1.53	1.53	1.53	
	110	1.17	1.22	1.27	1.31	1.36	1.42	1.47	1.47	1.47	1.47	1.47	1.47	1.47	
	100	1.11	1.16	1.21	1.25	1.30	1.35	1.40	1.40	1.40	1.40	1.40	1.40	1.40	
	90	1.05	1.10	1.15	1.19	1.24	1.29	1.34	1.34	1.34	1.34	1.34	1.34	1.34	
	80	1	1.04	1.09	1.13	1.18	1.23	1.28	1.28	1.28	1.28	1.28	1.28	1.28	
	70	1	1	1.03	1.07	1.12	1.17	1.21	1.21	1.21	1.21	1.21	1.21	1.21	
	60	1	1	1	1.01	1.06	1.10	1.15	1.15	1.15	1.15	1.15	1.15	1.15	
	50	1	1	1	1	1	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
			0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing reduction may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation program.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).

- 1) Fuel Usage Guide Deration
- 2) $1 - ((1 - \text{Altitude/Temperature Deration}) + (1 - \text{RPC}))$

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See notes 28 and 29 for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

INLET AND EXHAUST RESTRICTIONS FOR ALTITUDE CAPABILITY:

The altitude derate chart is based on the maximum inlet and exhaust restrictions provided on page 1. Contact factory for restrictions over the specified values. Heavy Derates for higher restrictions will apply.

NOTES:

1. Generator efficiencies, power factor, and voltage are based on standard generator. [Genset Power (ekW) is calculated as: Engine Power (bkW) x Generator Efficiency], [Genset Power (kVA) is calculated as: Engine Power (bkW) x Generator Efficiency / Power Factor]
2. Rating is with two engine driven water pumps. Tolerance is (+)3, (-)0% of full load.
3. ISO 3046/1 Genset efficiency tolerance is (+)0, (-)5% of full load % efficiency value based on a 1.0 power factor.
4. Thermal Efficiency is calculated based on energy recovery from the jacket water, lube oil, 1st stage aftercooler, and exhaust to 248°F with engine operation at ISO 3046/1 Genset Efficiency, and assumes unburned fuel is converted in an oxidation catalyst.
5. Total efficiency is calculated as: Genset Efficiency + Thermal Efficiency. Tolerance is ±10% of full load data.
6. ISO 3046/1 Genset fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal genset and engine fuel consumption tolerance is ± 2.5% of full load data.
7. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
8. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
9. Inlet manifold temperature is a nominal value with a tolerance of ± 9°F.
10. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
11. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
12. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
13. Inlet and Exhaust Restrictions are maximum allowed values at the corresponding loads. Increasing restrictions beyond what is specified will result in a significant engine derate.
14. Emissions data is at engine exhaust flange prior to any after treatment.
15. NOx tolerances are ± 18% of specified value.
16. CO, CO₂, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes.
17. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
18. Exhaust Oxygen tolerance is ± 0.5; Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
19. LHV rate tolerance is ± 2.5%.
20. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
21. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
22. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
23. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
24. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
25. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
26. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
27. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
28. Total Jacket Water Circuit heat rejection is calculated as: $(JW \times 1.1) + (OC \times 1.2) + (1AC \times 1.05) + [0.84 \times (1AC + 2AC) \times (ACHRF - 1) \times 1.05]$. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
29. Total Second Stage Aftercooler Circuit heat rejection is calculated as: $(2AC \times 1.05) + [(1AC + 2AC) \times 0.16 \times (ACHRF - 1) \times 1.05]$. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1500	100	2098	116.6	81.0	89.6	93.8	93.8	95.7	96.4	99.2	102.7	103.2	103.6
1125	75	1578	114.9	80.2	89.1	92.4	91.0	94.1	95.0	97.9	102.2	102.5	102.9
750	50	1065	113.5	78.3	86.2	89.0	85.6	90.7	93.0	96.6	102.0	100.4	101.9

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1500	100	2098	106.0	106.0	104.4	103.2	103.8	102.7	102.0	101.8	106.5	108.5	99.7
1125	75	1578	105.4	105.7	103.8	102.5	103.5	102.5	101.8	101.9	106.5	99.6	98.1
750	50	1065	104.6	104.8	103.0	101.7	102.8	101.7	100.8	101.9	97.3	97.3	97.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1500	100	2098	123.1	105.1	116.6	113.3	109.6	101.7	100.5	106.0	103.3	97.4	100.7
1125	75	1578	122.0	103.7	116.3	113.3	109.9	101.0	98.5	105.0	101.3	94.6	100.8
750	50	1065	121.4	103.1	116.4	113.4	110.4	100.8	100.1	102.0	97.8	92.5	99.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1500	100	2098	102.4	104.4	106.9	109.4	110.1	109.6	110.7	111.9	113.2	108.7	110.5
1125	75	1578	100.5	99.8	103.9	107.6	107.8	107.2	108.3	109.9	112.4	110.2	105.4
750	50	1065	98.8	100.5	102.5	105.7	106.2	105.2	106.4	108.8	113.3	104.4	102.1

SOUND PARAMETER DEFINITION:

Sound Power Level Data - DM8702-02

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
 Sound power level -- Mechanical
 Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 6798. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A. Exhaust data is post-catalyst on gas engine ratings labeled as "Integrated Catalyst".

Measurements made in accordance with ISO 6798 for engine and exhaust sound level only. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

Attachment O

Attachment O
Monitoring, Recordkeeping, Reporting, Testing Plans.

ACP, LLC. will comply all of the monitoring, recordkeeping, reporting, and testing requirements established in the issued permit for ACP 1 Station.

Attachment P

PUBLISHER'S CERTIFICATE

I, Loretta Greathouse,
Advertising Manager of THE EXPONENT
TELEGRAM, a newspaper of general circulation
published in the city of Clarksburg, County and state
aforesaid, do hereby certify that the annexed:

AIR QUALITY PERMIT NOTICE

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that Atlantic Coast Pipeline, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for an R-13 Permit for a new compressor station operation located in West Milford, Lewis County, West Virginia. The latitude and longitude coordinates are: 39.14190 and -80.47318.

The applicant estimates the maximum potential to discharge the following regulated air pollutants on a facility-wide basis will be:

- Carbon Monoxide (CO) = 74.42 tpy Nitrogen Oxides (NOX) = 44.36 tpy
- Particulate Matter (PMCondensable) = 0.48 tpy
- Particulate Matter (PM2.5) = 12.33 tpy
- Particulate Matter (PM10) = 12.33 tpy
- Sulfur Dioxide (SO2) = 7.24 tpy Formaldehyde = 3.03 tpy
- Volatile Organic Compounds (VOC) = 56.13 tpy Benzene = 0.01 tpy
- Toluene = 0.62 tpy
- Ethyl benzene = less than 0.001 tpy Xylene = less than 0.001 tpy
- Hazardous Air Pollutants (HAPs) = 5.70 tpy
- Carbon Dioxide Equivalents (CO2e) = 304,519 tpy

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.

All questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 26th day of September, 2015. By:
Atlantic Coast Pipeline, LLC
Robert Bisha
Project Director Atlantic Coast Pipeline
Dominion Environmental Services
509 Dominion Blvd
Glen Allen, VA 23060

published in THE EXPONENT-TELEGRAM 1
commencing on 09/26/2015 and ending on
2015 at the request of

DOMINION RESOURCES.

under my hand this 09/29/15.

publisher's fee for said publication is: \$80.22.

Loretta Greathouse
Advertising Manager of The Exponent-Telegram

scribed to and sworn to before me this 09/29/15

Sarah Hurst
Notary Public in and for Harrison County, WV

My commission expires on
The 29th day of August 2017



Attachment Q

Attachment Q
Business Confidential Claims

There is no confidential information associated with this permit application.

Attachment R

ATLANTIC COAST PIPELINE, LLC
Secretary's Certificate

I, the undersigned, hereby certify that I am Assistant Secretary of Atlantic Coast Pipeline, LLC, a Delaware limited liability company (the "Company").

I further certify that the resolutions approved by Consent of the Board on September 25, 2014 (Attachment 1) have not been amended or revoked and that the same is now in full force and effect until revoked.

IN WITNESS WHEREOF, I have hereunto set my hand and have affixed the corporate seal of said Company this 30th day of October, 2014.



Karen W. Doggett
Assistant Secretary

CORPORATE
SEAL

ATLANTIC COAST PIPELINE, LLC

Excerpt From Records Effective September 25, 2014

RESOLVED, that certain authorized representatives identified in Appendix B (the "Environmental Authorized Representatives") attached hereto are hereby approved to enter into any contract, application, survey request or any other document subject to the Board's approval requirements contained in Section 6.7 of the LLC Agreement, in an amount not to exceed the amount designated in the appendix, as may be required in the performance of an environmental review of the Project and to comply with all related applicable state, local and federal environmental requirements, including environmental surveys and environmental permit applications;

APPENDIX B

**ATLANTIC COAST PIPELINE, LLC
Expenditure Approval Authority - Environmental
Effective September 25, 2014**

Title	Name	Designated Amount
Vice President	Anne E. Bomar	\$25,000,000
Vice President and Treasurer	G. Scott Hetzer	\$25,000,000
Authorized Representative	Pamela F. Faggert	\$5,000,000
Authorized Representative	Leslie Hartz	\$5,000,000
Authorized Representative	Carole McCoy	\$500,000
Authorized Representative	Robert M. Bisha	\$500,000
Authorized Representative	Brian Wilson	\$500,000

Attachment S

Attachment S
Title V Permit Revision Information

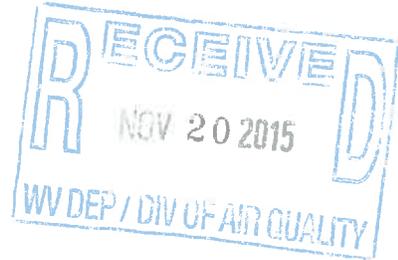
An Attachment S is not being provided with this permit application since the site does not currently possess a Title V Permit.



November 19, 2015

BY: OVERNIGHT MAIL

Mr. Joseph Kessler, PE
Engineer
Division of Air Quality
West Virginia Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia, 25304



RE: Marts Compressor Station
Construction Permit Application

I.D. No. 041-02576 Reg. 3271
Company AC PERMITS
Facility MARTS Region _____
Initials JK

Dear Mr. Kessler:

The Marts Compressor Station construction permit application was originally sent to the Division of Air Quality (DAQ) on September 15, 2015. Based on an initial review of the application, DAQ determined that the following items needed to be addressed prior to the application being deemed complete. Responses to the requested items are also provided below.

1. The check for the permit application fees of \$4,500 was returned for insufficient funds, please submit another check for \$4,500.
A new check was sent on October 27, 2015.
2. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, the original affidavit of publication from the required Class I Legal Advertisement (re-run with the correct reference to a construction permit and not a General Permit) has not been submitted.
The public notice with the correct reference was published and the original affidavit was sent to DAQ on October 16, 2015.
3. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, no MSDS have been submitted.
An MSDS for aqueous ammonia is included in the enclosed updated application.
4. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, two (2) separate disks each with a scanned version of the signed permit application need to be submitted.
Two discs with scanned copies of the updated application will be submitted under separate cover.

Entire Document
NON-CONFIDENTIAL

5. Please provide a description of the relationship between Atlantic Coast Pipeline, L.L.C. (ACP) and Dominion to verify that Ms. Leslie Hartz meets the definition of "Responsible Official" under 45-13-2.22 for ACP. Further, the parent company of ACP was listed as ACP.

Atlantic Coast Pipeline, LLC, is jointly owned by Dominion, Duke Energy, Piedmont Natural Gas, and AGL Resources to build and own the proposed Atlantic Coast Pipeline. Information has been included in the application documenting Leslie Hartz as an Authorized Representative for ACP in Attachment R.

6. Please update the permit application with ACP's Federal Employee Identification Number.

The Federal Employee Identification Number has been entered on the application.

7. The Oxidation Catalysts and the Selective Catalytic Reduction (SCR) system are considered control devices and should be given control device numbers in Attachment I and should have associated Air Pollution Control Device Sheets filled out (understanding that much of the information asked for is not relevant to an SCR and Oxidation Catalyst).

Unique identifiers for the oxidation catalyst and SCR emission controls have been added to the equipment list in Attachment I and Air Pollution Control Device Sheets have been added in Attachment M.

As requested, enclosed is a new signed copy of the updated permit application. As stated above, two discs containing scanned electronic copies will be submitted separately.

Should you have any questions or need additional information, please feel free to contact William Scarpinato at (804) 273-3019 or via email at william.a.scarpinato@dom.com.

Sincerely,



Robert M. Bisha
Project Director, Atlantic Coast Pipeline
Dominion Environmental Services

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Web Address: www.dom.com



October 27, 2015

BY: OVERNIGHT MAIL

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

RE: Marts Compressor Station
Construction Permit Application

Dear Mr. Durham:

A problem with the fee payment check sent with the application for the above referenced project required that a new check be issued. Enclosed is a check in the amount of \$4,500.

Should you have any questions or need additional information, please feel free to contact William Scarpinato at (804) 273-3019 or via email at william.a.scarpinato@dom.com.

Sincerely,

Robert M. Bisha
Project Director, Atlantic Coast Pipeline
Dominion Environmental Services

Entire Document
NON-CONFIDENTIAL

ID. No. 041-00076 Reg. 3271
Company AC PIPELINE
Facility MARTS
Initials RB

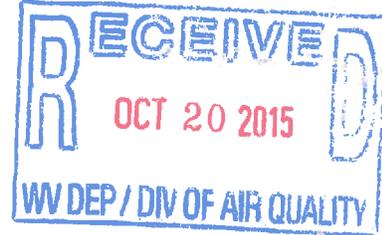
Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Web Address: www.dom.com



October 16, 2015

BY: OVERNIGHT MAIL

Mr. Joseph Kessler
WVDEP - Division of Air Quality
601 57th Street SE
Charleston, West Virginia 25304



RE: Marts Compressor Station
Construction Permit Application

Dear Mr. Kessler,

Attached is the original Publisher's Certificate of the Air Quality Permit Notice of Application for the above referenced project at the Marts Compressor Station.

Should you have any questions or need additional information, please feel free to contact William Scarpinato at (804) 273-3019 or via email at william.a.scarpinato@dom.com.

Sincerely,

Robert M. Bisha
Project Director, Atlantic Coast Pipeline
Dominion Environmental Services

ID. No. CHL-00076 Reg. 3271
Company AP PIPELINE
Facility MARTS Region _____
Initials RB

Entire Document
NON-CONFIDENTIAL

PUBLISHER'S CERTIFICATE

I, Loretta Greathouse,
Advertising Manager of THE EXPONENT
TELEGRAM, a newspaper of general circulation
published in the city of Clarksburg, County and state
aforesaid, do hereby certify that the annexed:

AIR QUALITY PERMIT NOTICE

published in THE EXPONENT-TELEGRAM 1
commencing on 09/26/2015 and ending on
2015 at the request of

DOMINION RESOURCES.

under my hand this 09/29/15.

publisher's fee for said publication is: \$80.22.

Loretta Greathouse
Advertising Manager of The Exponent-Telegram

scribed to and sworn to before me this 09/29/15

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Atlantic Coast Pipeline, LLC. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for an R-13 Permit for a new compressor station operation located in West Milford, Lewis County, West Virginia. The latitude and longitude coordinates are: 39.14190 and -80.47318.

The applicant estimates the maximum potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Carbon Monoxide (CO) = 74.42 tpy Nitrogen Oxides (NOX) = 44.36 tpy
 Particulate Matter (PMCondensable) = 0.48 tpy
 Particulate Matter (PM2.5) = 12.33 tpy
 Particulate Matter (PM10) = 12.33 tpy
 Sulfur Dioxide (SO2) = 7.24 tpy Formaldehyde = 3.03 tpy
 Volatile Organic Compounds (VOC) = 56.13 tpy Benzene = 0.01 tpy
 Toluene = 0.02 tpy
 Ethyl benzene = less than 0.001 tpy Xylene = less than 0.001 tpy
 Hazardous Air Pollutants (HAPs) = 5.70 tpy
 Carbon Dioxide Equivalents (CO2e) = 304,519 tpy

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.

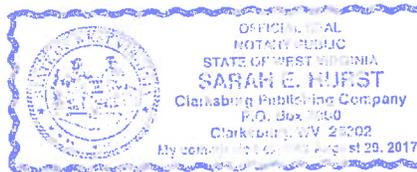
Any questions regarding this permit application should be directed to the DAQ at (304) 926- 0499, extension 1250, during normal business hours.

Dated this the 26th day of September, 2015. By:
 Atlantic Coast Pipeline, LLC.
 Robert Bisha
 Project Director Atlantic Coast Pipeline
 Dominion Environmental Services
 500 Dominion Blvd.
 Glen Allen, VA 23060



Sarah Hurst
Notary Public in and for Harrison County, WV

My commission expires on
The 29th day of August 2017



Kessler, Joseph R

From: Kessler, Joseph R
Sent: Thursday, October 15, 2015 9:25 AM
To: William A Scarpinato (william.a.scarpinato@dom.com)
Subject: R13-3271 Permit Application Review Status

**RE: Application Status: Incomplete
Atlantic Coast Pipeline, L.L.C.
Marts Compressor Station
Permit Application: R13-3271
Plant ID No.: 041-00076**

Dear Mr. Scarpinato:

Your application for a construction permit was received by the Division of Air Quality (DAQ) on September 15, 2015 and assigned to the writer for review. Upon an initial review of the application, it has been determined that the following items need to be addressed prior to the application being deemed complete:

1. The check for the permit application fees of \$4,500 was returned for insufficient funds, please submit another check for \$4,500;
2. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, the original affidavit of publication from the required Class I Legal Advertisement (re-run with the correct reference to a construction permit and not a General Permit) has not been submitted;
3. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, no MSDS have been submitted;
4. As requested in an e-mail sent by Ms. Sandra Adkins on September 18, 2015, two (2) separate disks each with a scanned version of the signed permit application need to be submitted;
5. Please provide a description of the relationship between Atlantic Coast Pipeline, L.L.C. (ACP) and Dominion to verify that Ms. Leslie Hartz meets the definition of "Responsible Official" under 45-13-2.22 for ACP. Further, the parent company of ACP was listed as ACP. Please correct this if this is inaccurate;
6. Please update the permit application with ACP's Federal Employee Identification Number;
7. The Oxidation Catalysts and the Selective Catalytic Reduction (SCR) system are considered control devices and should be given control device numbers in Attachment I and should have associated Air Pollution Control Device Sheets filled out (understanding that much of the information asked for is not relevant to an SCR and Oxidation Catalyst).

Due to the number of additions to the permit application, please submit a new signed copy of the permit application and include a scanned electronic version of the updated signed copy on the disks.

Please address the above items as quickly as possible in order to facilitate review of the permit application. Should you have any questions, please contact me at (304) 926-0499 ext. 1219.

Joe Kessler, PE
Engineer
West Virginia Division of Air Quality
601-57th St., SE
Charleston, WV 25304
Phone: (304) 926-0499 x1219
Fax: (304) 926-0478
Joseph.r.kessler@wv.gov

Entire Document
NON-CONFIDENTIAL

Adkins, Sandra K

From: Adkins, Sandra K
Sent: Friday, September 18, 2015 11:43 AM
To: 'leslie.hartz@dom.com'; 'william.a.scarpinato@dom.com'
Cc: McKeone, Beverly D; Kessler, Joseph R
Subject: WV DAQ Permit Application Status for Atlantic Coast Pipeline, LLC; Marts Compressor Station

**RE: Application Status
Atlantic Coast Pipeline, LLC
Marts Compressor Station
Plant ID No. 041-00076
Application No. R13-3271**

Entire Document
NON-CONFIDENTIAL

Leslie Hartz,

Your application for a construction permit for the Marts Compressor Station was received by this Division on September 17, 2015, and was assigned to Joe Kessler. The following items were not included in the initial application submittal:

Original affidavit for Class I legal advertisement not submitted.

**Please note to use phone extension 1250 for legal ads. Must republish ad – application is for a construction permit for the Marts Compressor Station, not a general permit registration.*

Original and two electronic copies of the application not submitted.

**Need 2 copies of application on CD. The electronic versions must include signatures.*

Applicable technical forms not completed and submitted.

**MSDS sheets are missing.*

These items are necessary for the assigned permit writer to continue the 30-day completeness review.

Within 30 days, you should receive a letter from Joe stating the status of the permit application and, if complete, given an estimated time frame for the agency's final action on the permit.

Any determination of completeness shall not relieve the permit applicant of the requirement to subsequently submit, in a timely manner, any additional or corrected information deemed necessary for a final permit decision.

Should you have any questions, please contact the assigned engineer, Joe Kessler, at 304-926-0499, extension 1219.