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

Company:	Appalachia Midstream Services, LLC			**Facility:**	Sand Hill Station
Region:	1	**Plant ID:**	051-00145	**Application #:**	13-2913A
Engineer:	Kessler, Joe			**Category:**	
Physical Address:	Golden Road Dallas WV 26036			SIC: [1311] OIL AND GAS EXTRACTION - CRUDE PETROLEUM & NATURAL GAS NAICS: [211111] Crude Petroleum and Natural Gas Extraction SIC: [1382] OIL AND GAS EXTRACTION - OIL AND GAS EXPLORATION SERVICE NAICS: [213112] Support Activities for Oil and Gas Operations	
County:	Marshall				
Other Parties:	VICE PRES - Hunter, Paul 412-787-5561 Contact - Hong, Kijun 405-727-1245				

Information Needed for Database and AIRS
1. Need valid physical West Virginia address with zip

Regulated Pollutants

CO	Carbon Monoxide	75.300 TPY
VOC	Volatile Organic Compounds (Reactive organic gases)	98.040 TPY
VHAP	VOLATILE ORGANIC HAZARDOUS AIR POLLUTANT	16.930 TPY

Summary from this Permit 13-2913A

Air Programs	Applicable Regulations
NSPS	
SIP	
AFTER FACT	
Synthetic Minor	
Synthetic Minor for Title V	

Fee Program	Fee	Application Type
8D	$4,500.00	MODIFICATION

Notes from Database
Permit Note: After-the-fact modification to: (1) reduce the CO and VOC control efficiencies claimed for the oxidation catalysts, (2) increase the associated potential-to-emit (PTE) of the compressor engines, and (3) revise the potential emissions from the glycol dehydration units (GDUs), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations.

Permit Note: Long delay in the review of this action was caused by AMS' slow response to repeated inquiries about flash-gas emissions. NOD was finally sent, and a revised application was submitted on 3-16-16.

Activity Dates

APPLICATION RECIEVED	09/14/2015	
APPLICATION FEE PAID	09/16/2015	1000
ASSIGNED DATE	09/16/2015	
APPLICATION FEE PAID	10/09/2015	2500
APPLICATION INCOMPLETE	10/14/2015	
APPLICATION FEE PAID	10/27/2015	1000
APPLICATION DEEMED COMPLETE	10/30/2015	
ADDITIONAL INFO REQUESTED	01/06/2016	
NOD SENT	03/03/2016	
ADDITIONAL INFO RECEIVED	03/16/2016	

2913A
~~SANDIE~~
NOTICE

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: 051-00145
Company: Appalachia Midstream Services,
Printed: 03/22/2016
Engineer: Kessler, Joe

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On September 14, 2015, Appalachian Midstream Services, L.L.C. applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to modify the Sand Hill Compressor Station located approximately 2.50 miles southwest of Dallas, Marshall County, WV at latitude 39.98754 and longitude -80.55586. 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 R13-2913A.

The following changes in potential emissions will be authorized by this permit action: Carbon Monoxide, 61.56 tons per year (TPY); Volatile Organic Compounds, 12.53 TPY; Hazardous Air Pollutants, -0.28 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

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: Thursday, March 31, 2016 10:32 AM
To: 'wentworth.paul@epa.gov'; 'bradley.megan@epa.gov'; kijun.hong@williams.com
Cc: Durham, William F; McKeone, Beverly D; McCumbers, Carrie; Hammonds, Stephanie E; Rice, Jennifer L; Taylor, Danielle R; Kessler, Joseph R; Seevers, Sharon M
Subject: WV Draft Permit for Appalachian Midstream Services, L.L.C.; Sand Hill Compressor Station
Attachments: 2913A.pdf; Eval2913A.pdf; notice.pdf

Please find attached the Draft Permit R13-2913A, Engineering Evaluation, and Public Notice for Appalachian Midstream Services, L.L.C.'s Sand Hill Compressor Station located in Marshall County.

The notice will be published in *The Moundsville Daily Echo* on Monday, April 4, 2016, and the thirty day public comment period will end on Wednesday, May 4, 2016.

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

Kessler, Joseph R

From: Adkins, Sandra K
Sent: Thursday, March 31, 2016 10:25 AM
To: Charles Walton
Cc: Kessler, Joseph R
Subject: RE: CORRECTION Publication of Class I Legal Ad for the WV Division of Air Quality

Thank you very much!!

From: Charles Walton [mailto:mdsvecho@gmail.com]
Sent: Thursday, March 31, 2016 8:51 AM
To: Adkins, Sandra K <Sandra.K.Adkins@wv.gov>
Subject: Re: CORRECTION Publication of Class I Legal Ad for the WV Division of Air Quality

received

On Thu, Mar 31, 2016 at 8:44 AM, Adkins, Sandra K <Sandra.K.Adkins@wv.gov> wrote:

CORRECTION:

Version sent earlier did not contain the full heading for the legal advertisement. Please publish this version. Thank you.

Please publish the information below as a Class I legal advertisement (one time only) in the Monday, April 4, 2016, issue of the *Moundsville Daily Echo*. 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

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Kessler, Joseph R

From: Adkins, Sandra K
Sent: Thursday, March 31, 2016 8:45 AM
To: Charles Walton
Cc: Kessler, Joseph R
Subject: CORRECTION Publication of Class I Legal Ad for the WV Division of Air Quality

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Kessler, Joseph R

From: Adkins, Sandra K
Sent: Thursday, March 31, 2016 8:41 AM
To: Charles Walton
Cc: Kessler, Joseph R
Subject: Publication of Class I Legal Ad for the WV Division of Air Quality

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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

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West Virginia Department of Environmental Protection

Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Modify

Entire Document
NON-CONFIDENTIAL

R13-2913A

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 above-referenced facility is authorized to construct the stationary sources of air pollutants identified herein in accordance with all terms and conditions of this permit.

Issued to:

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
051-00145

DRAFT

William F. Durham
Director

Issued: DRAFT

This permit will supercede and replace R13-2913 issued on July 23, 2012.

Facility Location:	Dallas, Marshall County, West Virginia
Mailing Address:	PO Box 18312, Oklahoma City, OK 73154-0312
Facility Description:	Natural Gas Compressor Station
NAICS Codes:	213112
UTM Coordinates:	537.993 km Easting • 4,426.286 km Northing • Zone 17
Latitude/Longitude	39.98754/-80.55586
Permit Type:	Modification
Description of Change:	After-the-fact modification to: (1) reduce the CO and VOC control efficiencies claimed for the oxidation catalysts, (2) increase the associated potential-to-emit (PTE) of the compressor engines, and (3) revise the potential emissions from the glycol dehydration units (GDUs), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations.

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.

The source is not subject to 45CSR30.

Table of Contents

1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
EUCE-1	EPCE-1	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-2	EPCE-2	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-3	EPCE-3	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-4	EPCE-4	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-5	EPCE-5	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-6	EPCE-6	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-7	EPCE-7	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-8	EPCE-8	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-9	EPCE-9	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-10	EPCE-10	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-11	EPCE-11	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUCE-12	EPCE-12	Caterpillar G3516B Compressor Engine	2012	1,380 hp	Oxidation Catalyst
EUGEN-1	EPGEN-1	Capstone C600 Microturbine Generator	2012	805 hp	None
EUDHY-1	EPSTL-1	TEG Dehydration Unit Still Vent	2012	55.0 mmscfd	APCCOND -1
EUDHY-1	EPRBL-1	TEG Reboiler	2012	1.0 MMBTU/hr	None
EUDHY-2	EPSTL-2	TEG Dehydration Unit Still Vent	2012	55.0 mmscfd	APCCOND -2
EUDHY-2	EPRBL-2	TEG Reboiler	2012	1.0 MMBTU/hr	None
EUDHY-3	EPSTL-3	TEG Dehydration Unit Still Vent	2012	55.0 mmscfd	APCCOND -3
EUDHY-3	EPRBL-3	TEG Reboiler	2012	1.0 MMBTU/hr	None
EUHT-1	EPHT-1	Heater Treater Burner	2012	0.5 MMBTU/hr	None

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
EUHT-2	EPHT-2	Heater Treater Burner	2012	0.5 MMBTU/hr	None
EUTK-1	EPTK-1	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-2	EPTK-2	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-3	EPTK-3	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-4	EPTK-4	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-5	EPTK-5	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-6	EPTK-6	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-7	EPTK-7	Condensate Storage Tank	2012	400 bbl	VRU
EUTK-8	EPTK-8	Condensate Storage Tank	2012	400 bbl	VRU
EUWTK-9	EPWTK-9	Produced Water Storage Tank	2012	400 bbl	VRU
EUWTK-10	EPWTK-10	Produced Water Storage Tank	2012	400 bbl	VRU
EULOAD-1	EPLOAD-1	Condensate Truck Loading	2012	15,120 gal/hr	APC-CARBON
EULOAD-2	EPLOAD-2	Produced Water Truck Loading	2012	15,120 gal/hr	APC-CARBON

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 (45CSR§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	**NOx**	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 2.5 μm 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 will supercede and replace R13-2913. 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 other 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 Application R13-2913, R13-2913A, 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 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 emissions, 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 45CSR11.
[45CSR§11-5.2.]

3.2. Monitoring Requirements

[Reserved]

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
Charleston, WV 25304-2345

If to the US EPA:
Associate Director
Office of Enforcement and Permits Review
(3AP12)
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 45CSR22 – Air Quality Management Fee Program, the permittee shall not operate nor cause to operate the permitted facility or other associated facilities on the same or contiguous sites comprising the plant without first obtaining and having in current effect a Certificate to Operate (CTO). Such Certificate to Operate (CTO) shall be renewed annually,

shall be maintained on the premises for which the certificate 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 45CSR22 – Air Quality Management Fee Program, enclosed with this permit is an Application for a Certificate to Operate (CTO), from the date of initial startup through the following June 30. Said application 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 Section 4.5 of 45CSR22. A copy of this schedule may be found on the reverse side of the Application for a Certificate to Operate (CTO).

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. **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.

4.1.2. **Minor Source of Hazardous Air Pollutants (HAP).** HAP emissions from the facility shall be less than 10 tons/year of any single HAP and 25 tons/year of any combination of HAPs. Compliance with this Section shall ensure that the facility is a minor HAP source.

4.1.3. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate the control devices listed in Section 1.1 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.]

4.1.4. **Record of Malfunctions of Air Pollution Control Equipment.** For the control devices listed in Section 1.1, 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.

5.0. Source-Specific Requirements (Engines, EPCE-1 – EPCE-12)

5.1. Limitations and Standards

5.1.1. To demonstrate compliance with Section 5.1.2, the quantity of natural gas that shall be consumed in each of the twelve (12) 1,380 hp natural gas fired reciprocating engines, Caterpillar G3516B (EPCE-1 – EPCE-12) shall not exceed 9,233 cubic feet per hour and 80.88 x 10^6 cubic feet per year for each engine.

5.1.2. Maximum emissions from each of the twelve (12) 1,380 hp natural gas fired reciprocating engines, Caterpillar G3516B (EPCE-1 – EPCE-12) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	1.52	6.66
Carbon Monoxide	1.36	5.96
Volatile Organic Compounds	0.88	3.86
Formaldehyde	0.06	0.27

5.1.3. Requirements for Use of Catalytic Reduction Devices

a. Lean-burn natural gas compressor engines (EPCE-1 – EPCE-12) equipped with oxidation catalyst air pollution control devices shall be fitted with a closed-loop automatic feedback controller to ensure emissions of regulated pollutants do not exceed the potential to emit for any engine/oxidation catalyst combination under varying load. The closed-loop, automatic air/fuel ratio controller shall control a fuel metering valve to ensure a fuel-lean mixture.

b. For natural gas compressor engines (EPCE-1 – EPCE-12), the permittee shall monitor the temperature to the inlet of the catalyst and in accordance with manufacturer's specifications, a high temperature alarm shall shut off the engine before thermal deactivation of the catalyst occurs. If the engine shuts off due to high temperature, the permittee shall also check for thermal deactivation of the catalyst before normal operations are resumed.

c. The permittee shall follow the written operation and maintenance plan submitted with Permit Application R13-2913, which details the periodic and annual maintenance requirements.

d. Upon request by the Director, testing shall be conducted using a portable analyzer in accordance with a protocol approved by the Director. Such controls shall ensure proper and efficient operation of the engine and air pollution control devices.

5.2. Monitoring Requirements

5.2.1. Catalytic Oxidizer Control Devices

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 the engine'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:

1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
2. Following operating and maintenance recommendations of the catalyst element manufacturer.

5.3. Recordkeeping Requirements

5.3.1. To demonstrate compliance with sections 5.1-5.2, the permittee shall maintain records of the amount of natural gas consumed in each engine and the hours of operation of each engine. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

5.3.2. To demonstrate compliance with section 5.1.3, the permittee shall maintain records of the maintenance performed on each engine. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

6.0. Source-Specific Requirements (Microturbine Generator, EPGEN-1)

6.1. Limitations and Standards

6.1.1. To demonstrate compliance with Section 6.1.2, the quantity of natural gas that shall be consumed in 805 hp natural gas fired microturbine generator, Capstone C600 (EPGEN-1) shall not exceed 5,623 cubic feet per hour and 49.26 x 10^6 cubic feet per year for each engine.

6.1.2. Maximum emissions from the 805 hp natural gas fired microturbine generator, Capstone C600 (EPGEN-1) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	0.25	1.09
Carbon Monoxide	0.62	2.70
Volatile Organic Compounds	0.02	0.07
Formaldehyde	0.01	0.02

6.2. Recordkeeping Requirements

6.2.1. To demonstrate compliance with sections 6.1-6.2, the permittee shall maintain records of the amount of natural gas consumed in the microturbine generator and the hours of operation. Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

7.0. Source-Specific Hazardous Air Pollutant Requirements (Natural Gas Dehydration Units (EUDHY-1, EUDHY-2, EUDHY-3) Not Subject to MACT Standards and being controlled by Recycling the Dehydration Unit Back to Flame Zone of Reboiler)

7.1. Limitations and Standards

7.1.1. Maximum Throughput Limitation. To demonstrate compliance with Section 7.1.5, the maximum wet natural gas throughput to the glycol dehydration unit/still columns shall not exceed the following.

Emission Point ID	Maximum Wet Natural Gas Throughput
EPSTL-1	55.0 mmscf/day
EPSTL-2	55.0 mmscf/day
EPSTL-3	55.0 mmscf/day

7.1.2. Maximum Design Heat Input. The maximum design heat input for the Glycol Reboilers shall not exceed the following limits:

Emission Point ID	Maximum Design Heat Input
EPRBL-1	1.0 mmBtu/hr
EPRBL-2	1.0 mmBtu/hr
EPRBL-3	1.0 mmBtu/hr

7.1.3. To demonstrate compliance with Section 7.1.4, the quantity of natural gas that shall be consumed in each of the 1.0 MMBtu/hr Glycol Reboilers (EPRBL-1, EPRBL-2, EPRBL-3) shall not exceed 750 cubic feet per hour and 6.55×10^6 cubic feet per year for each reboiler.

7.1.4. Maximum emissions from each of the Glycol Reboilers (EPRBL-1, EPRBL-2, EPRBL-3) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	0.08	0.33
Carbon Monoxide	0.06	0.28
Volatile Organic Compounds	0.01	0.02

7.1.5. Maximum emissions from each of the Glycol Regenerator Still Columns (EPSTL-1, EPSTL-2, EPSTL-3) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Volatile Organic Compounds	0.42	1.84
Total HAPs	0.01	0.01

7.1.6. For purposes of determining potential HAP emissions at production-related facilities, the methods specified in 40 CFR 63, Subpart HH (i.e. excluding compressor engines from HAP PTE) shall be used.

7.1.7. Each glycol dehydration unit/still column (EPSTL-1, EPSTL-2, EPSTL-3) shall be equipped with a fully functional NATCO BTEX Buster (APCCOND-1, APCCOND-2, APCCOND-3) at all times. The NATCO BTEX Buster (APCCOND-1, APCCOND-2, APCCOND-3) shall be operated according to manufacturer's specifications, and shall be properly maintained in a manner which prevents the unit from freezing.

7.1.8. Recycled reboilers (EPRBL-1, EPRBL-2, EPRBL-3) subject to this section shall be designed and operated in accordance with the following:

a. The vapors/overheads from the still column shall be routed through a closed vent system to the reboiler at all times when there is a potential that vapors (emissions) can be generated from the still column;

b. The reboiler shall only be fired with vapors from the still column and flash tank, and natural gas may be used as supplemental fuel;

c. The vapors/overheads from the still column and flash tank shall be introduced into the flame zone of the reboiler as the primary fuel or with the primary fuel before the combustion chamber; and

d. The reboilers shall be equipped with a burner management system to ensure a constant flame for the combustion of vapors.

7.2. Monitoring Requirements

7.2.1. The permittee shall monitor the throughput of wet natural gas fed to the dehydration system on a monthly basis for the glycol dehydration units (EUDHY-1, EUDHY-2, EUDHY-3).

7.2.2. The permittee shall monitor the throughput of liquid gathered in storage from the condenser on a monthly basis.

7.3. Recordkeeping Requirements

7.3.1. The permittee shall maintain a record of the wet natural gas throughput through the glycol dehydration units (EUDHY-1, EUDHY-2, EUDHY-3) to demonstrate compliance with section 7.1.1 of this permit. Said records shall be maintained for a period of five (5) years on site or in a readily accessible off-site location maintained by the permittee. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a

requirement of this permit or upon request by the Director shall be certified by a responsible official.

7.3.2. The permittee shall maintain a record of the condensate gathered from the condenser to demonstrate compliance with section 7.2.2 of this permit. Said records shall be maintained for a period of five (5) years on site or in a readily accessible off-site location maintained by the permittee. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

7.3.3. To demonstrate compliance with section 7.1.3, 7.1.4, and 7.1.5 the permittee shall maintain records of the amount of natural gas consumed in the Glycol Reboilers (EPRBL-1, EPRBL-2, EPRBL-3). Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

7.3.4. For the purpose of demonstrating compliance with section 4.1.2 and 7.1.6, the permittee shall maintain a record of all potential to emit (PTE) HAP calculations for the entire affected facility. These records shall include the natural gas compressor engines and ancillary equipment.

8.0. Source-Specific Requirements (Heater Treaters, EPHT-1 - EPHT-2)

8.1. Limitations and Standards

8.1.1. Maximum Design Heat Input. The maximum design heat input for each of the Heater Treaters (EPHT-1, EPHT-2) shall not exceed 0.50 MMBTU/hr.

8.1.2. Maximum emissions from each of the 0.50 MMBTU/hr Heater Treaters (EPHT-1, EPHT-2) shall not exceed the following limits:

Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (ton/year)
Nitrogen Oxides	0.04	0.16
Carbon Monoxide	0.03	0.14

8.1.3. To demonstrate compliance with Section 8.1.2, the quantity of natural gas that shall be consumed in each of the 0.50 MMBTU/hr Heater Treaters (EPHT-1, EPHT-2) shall not exceed 375 cubic feet per hour and 3.27×10^6 cubic feet per year.

8.1.4. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average.
[45CSR§2-3.1.]

8.2. Monitoring Requirements

8.2.1. For the purpose of determining compliance with the opacity limits of 45CSR2, the permittee shall conduct visible emission checks and/or opacity monitoring and recordkeeping for all emission sources subject to an opacity limit.

The visible emission check shall determine the presence or absence of visible emissions. At a minimum, the observer must be trained and knowledgeable regarding the effects of background contrast, ambient lighting, observer position relative to lighting, wind, and the presence of uncombined water (condensing water vapor) on the visibility of emissions. This training may be obtained from written materials found in the References 1 and 2 from 40CFR Part 60, Appendix A, Method 22 or from the lecture portion of the 40CFR Part 60, Appendix A, Method 9 certification course.

Visible emission checks shall be conducted at least once per calendar month with a maximum of forty-five (45) days between consecutive readings. These checks shall be performed at each source for a sufficient time interval, but no less than one (1) minute, to determine if any visible emissions are present. Visible emission checks shall be performed during periods of facility operation and appropriate weather conditions.

If visible emissions are present at a source(s) for three (3) consecutive monthly checks, the permittee shall conduct an opacity reading at that source(s) using the procedures and requirements of Method 9 as soon as practicable, but within seventy-two (72) hours of the final visual emission check. A Method 9 observation at a source(s) restarts the count of the number of consecutive readings with the presence of visible emissions.

8.3. Testing Requirements

8.3.1. Compliance with the visible emission requirements of section 8.1.4 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 Director. The Director 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 section 6.1.14. Continuous opacity monitors shall not be required on fuel burning units which employ wet scrubbing systems for emission control.
[45CSR§2-3.2.]

8.4. Recordkeeping Requirements

8.4.1. To demonstrate compliance with sections 8.1.1-8.1.3, the permittee shall maintain records of the amount of natural gas consumed in the each of the 0.50 MMBTU/hr Heater Treaters (EPHT-1, EPHT-2). Said records shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

8.4.2. The permittee shall maintain records of all monitoring data required by Section 8.2.1 documenting the date and time of each visible emission check, the emission point or equipment/source identification number, the name or means of identification of the observer, the results of the check(s), whether the visible emissions are normal for the process, and, if applicable, all corrective measures taken or planned. The permittee shall also record the general weather conditions (i.e. sunny, approximately 80°F, 6 - 10 mph NE wind) during the visual emission check(s). Should a visible emission observation be required to be performed per the requirements specified in Method 9, the data records of each observation shall be maintained per the requirements of Method 9. For an emission unit out of service during the normal monthly evaluation, the record of observation may note "out of service" (O/S) or equivalent.

8.5. Reporting Requirements

8.5.1. Any violation(s) of the allowable visible emission requirement for any emission source discovered during observations using 40CFR Part 60, Appendix A, Method 9 must be reported in writing to the Director of the Division of Air Quality as soon as practicable, but within ten (10) calendar days, of the occurrence and shall include, at a minimum, the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned.

9.0. Source-Specific Requirements (Storage Tanks, EPTK-1 – EPTK-8, EPWTK-1, EPWTK-2)

9.1. Limitations and Standards

9.1.1. Emissions from the storage tanks (EPTK-1 – EPTK-8, EPWTK-1, EPWTK-2) shall be controlled by a vapor recovery system. This vapor recovery system shall be designed to achieve a minimum guaranteed control efficiency of 98% for volatile organic compound (VOC) emissions.

9.1.2. The vapor recovery system must be installed and operating prior to start-up of the storage tanks (EPTK-1 – EPTK-8, EPWTK-1, EPWTK-2). The downtime of the vapor recovery system shall not exceed 175 hours per 12-month rolling period.

9.2. Testing Requirements

9.2.1. For the purposes of determining compliance with Section 9.1.1, the permittee shall conduct monitoring to show compliance with the capture efficiency requirement and the maximum downtime requirement of the vapor recovery system as used to control emissions from the storage tanks (EPTK-1 – EPTK-8, EPWTK-1, EPWTK-2). The monitoring shall be conducted initially within 60 days after achieving the maximum production rate at which the facility will be operated or within 180 days of start-up, whichever is earlier. Monitoring will be conducted once every calendar year thereafter per the requirements of §60.482-10.

a. The vapor recovery system will be operated and monitored in compliance with §60.482-10(b), (f) through (m), and §60.485.

b. Records of the vapor recovery system will be maintained according to the requirements of §60.486 and §60.635(b).

9.2.2. The Director may approve or specify additional testing for demonstrating compliance with Section 9.1.1.

9.3. Recordkeeping Requirements

9.3.1. The vapor recovery system will comply with the recordkeeping requirements of §60.486 and §60.635(b).

9.4. Reporting Requirements

9.4.1. The permittee shall submit a written report of the results of testing required in 9.2.1 of this permit before the close of business on the 60th day following the completion of such testing to the Director. Such report(s) shall include all records of the control device performance parameters taken during such testing, whichever is appropriate for the required report.

10.0. Source-Specific Requirements (Truck Loading, EPLOAD-1, EPLOAD-2)

10.1. Limitations and Standards

10.1.1. Maximum Throughput Limitation. The maximum condensate throughput to the Condensate Truck Loading (EPLOAD-1) shall not exceed 15.12 x 10^3 gal/hour and 2.52 x 10^6 gal/yr. Compliance with the Maximum Throughput Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the monthly throughput at any given time during the previous twelve consecutive calendar months.

10.1.2. Maximum Throughput Limitation. The maximum produced water throughput to the Produced Water Truck Loading (EPLOAD-2) shall not exceed 15.12 x 10^3 gal/hour and 15.33 x 10^3 gal/yr. Compliance with the Maximum Throughput Limitation shall be determined using a twelve month rolling total. A twelve month rolling total shall mean the sum of the monthly throughput at any given time during the previous twelve consecutive calendar months.

10.1.3. The Condensate Truck Loading (EPLOAD-1) and the Produced Water Truck Loading (EPLOAD-2) shall be operated in accordance with the plans and specifications filed in Permit Application R13-2913. All emissions from the Condensate Truck Loading (EPLOAD-1) and the Produced Water Truck Loading (EPLOAD-2) will be controlled by a carbon canister (APC-CARBON) that shall be designed to achieve a minimum guaranteed control efficiency of 95% for volatile organic compound (VOC) emissions.

10.1.4. The carbon canister (APC-CARBON) must be operated at all times when gases, vapors, and fumes are vented from the Condensate Truck Loading (EPLOAD-1) and the Produced Water Truck Loading (EPLOAD-2). In addition, the carbon canister must be operated in series, as dual carbon canisters, in case of emission breakthrough in one carbon canister.

10.1.5. Prior to the loading of each truck, the saturation indicator on the carbon canister (APC-CARBON) must be checked to ensure that the carbon is not spent. If the saturation indicator demonstrates that the carbon is spent, no truck loading is allowed.

10.1.6. All carbon in the carbon canister (APC-CARBON) must be replaced with fresh carbon when the saturation indicator changes in color from pink to brown.

10.1.7. The permittee is required to possess on site, fresh replacements for all carbon canisters (APC-CARBON) being used.

10.2. Monitoring Requirements

10.2.1. The permittee shall monitor the Condensate Truck Loading (EPLOAD-1) and the Produced Water Truck Loading (EPLOAD-2) on a daily basis.

10.2.2. The permittee shall monitor all carbon canister (APC-CARBON) replacements.

10.3. Testing Requirements

10.3.1. The permittee shall maintain a record of the the Condensate Truck Loading (EPLOAD-1) and the Produced Water Truck Loading (EPLOAD-2) to demonstrate compliance with sections 10.1.1 and 10.1.2 of this permit. Said records shall be maintained for a period of five (5) years on site or in a readily accessible off-site location maintained by the permittee. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a

requirement of this permit or upon request by the Director shall be certified by a responsible official.

10.3.2. The permittee shall perform an initial design analysis for the carbon canister (APC-CARBON) that includes the vent stream composition, constituent concentrations, flowrate, relative humidity, and temperature, and shall establish the design exhaust vent stream organic compound concentration level, capacity of the carbon bed, type and working capacity of activated carbon used for the carbon bed, and design carbon replacement level based on the total working capacity of the carbon canister (APC-CARBON) and source operating schedule.

10.4. Recordkeeping Requirements

10.4.1. To demonstrate compliance with sections 10.1.1 and 10.1.2, the permittee shall maintain records of the amount of condensate processed in the Condensate Truck Loading area (EPLOAD-1) and produced water in the Produced Water Truck Loading Area (EPLOAD-2). Said records required shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

10.4.2. To demonstrate compliance with sections 10.1.5, the permittee shall maintain records that the saturation indicator was examined prior to the loading of any truck. Said records required shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

10.4.3. To demonstrate compliance with sections 10.1.6, the permittee shall maintain records of carbon canister replacements. Said records required shall be maintained on site or in a readily accessible off-site location maintained by the permittee for a period of five (5) years. Said records shall be readily available to the Director of the Division of Air Quality or his/her duly authorized representative for expeditious inspection and review. Any records submitted to the agency pursuant to a requirement of this permit or upon request by the Director shall be certified by a responsible official.

11.0. Source-Specific Requirements (40CFR60 Subpart JJJJ Requirements, EPCE-1 – EPCE-12)

11.1. Limitations and Standards

11.1.1. The provisions of this subpart are applicable to owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified below. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

a. Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

1. On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);

[40CFR§60.4230(a)]

11.1.2. If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable. [40CFR§60.4230(c)]

11.1.3. Stationary SI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR parts 90 and 1048, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security. [40CFR§60.4230(e)]

11.2. Emission Standards for Owners and Operators

11.2.1. 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. For owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 100 HP (except gasoline and rich burn engines that use LPG) manufactured prior to January 1, 2011 that were certified to the certification emission standards in 40 CFR part 1048 applicable to engines that are not severe duty engines, if such stationary SI ICE was certified to a carbon monoxide (CO) standard above the standard in Table 1 to this subpart, then the owners and operators may meet the CO certification (not field testing) standard for which the engine was certified. [40CFR§60.4233(e)]

11.2.2. Owners and operators of stationary SI ICE that are required to meet standards that reference 40 CFR 1048.101 must, if testing their engines in use, meet the standards in that section applicable to field testing, except as indicated in paragraph (e) of this section. [40CFR§60.4233(h)]

11.2.3. Owners and operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine. [40CFR§60.4234]

11.3. Other Requirements for Owners and Operators

11.3.1. After July 1, 2009, owners and operators may not install stationary SI ICE with a maximum engine power of greater than or equal to 500 HP that do not meet the applicable requirements in §60.4233, except that lean burn engines with a maximum engine power greater than or equal to

500 HP and less than 1,350 HP that do not meet the applicable requirements in §60.4233 may not be installed after January 1, 2010. [40CFR§60.4236(b)]

11.3.2. The requirements of this section do not apply to owners and operators of stationary SI ICE that have been modified or reconstructed, and they do not apply to engines that were removed from one existing location and reinstalled at a new location. [40CFR§60.4236(e)]

11.4. Compliance Requirements for Owners and Operators

11.4.1. If you are an owner or operator of a stationary SI internal combustion engine that is manufactured after July 1, 2008, and must comply with the emission standards specified in §60.4233(a) through (c), you must comply by purchasing an engine certified to the emission standards in §60.4231(a) through (c), as applicable, for the same engine class and maximum engine power. You must also meet the requirements as specified in 40 CFR part 1068, subparts A through D, as they apply to you. If you adjust engine settings according to and consistent with the manufacturer's instructions, your stationary SI internal combustion engine will not be considered out of compliance. In addition, you must meet one of the requirements specified in (a)(1) and (2) of this section.

1. If you operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, you must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required if you are an owner or operator.

2. If you do not operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, your engine will be considered a non-certified engine, and you must demonstrate compliance according to (a)(2)(i) through (iii) of this section, as appropriate.

   i. If you are an owner or operator of a stationary SI internal combustion engine less than 100 HP, you must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions, but no performance testing is required if you are an owner or operator.
   ii. If you are an owner or operator of a stationary SI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test within 1 year of engine startup to demonstrate compliance.
   iii. If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test within 1 year of engine startup and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

[40CFR§60.4243(a)]

11.4.2. If you are an owner or operator of a stationary SI internal combustion engine and must comply with the emission standards specified in §60.4233(d) or (e), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2) of this section.

1. Purchasing an engine certified according to procedures specified in this subpart, for the same model year and demonstrating compliance according to one of the methods specified in paragraph (a) of this section.

2. Purchasing a non-certified engine and demonstrating compliance with the emission standards specified in §60.4233(d) or (e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(i) and (ii) of this section.

    i. If you are an owner or operator of a stationary SI internal combustion engine greater than 25 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance.
    ii. If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

[40CFR§60.4243(b)]

11.4.3. If you are an owner or operator of a stationary SI internal combustion engine that must comply with the emission standards specified in §60.4233(f), you must demonstrate compliance according paragraph (b)(2)(i) or (ii) of this section, except that if you comply according to paragraph (b)(2)(i) of this section, you demonstrate that your non-certified engine complies with the emission standards specified in §60.4233(f). [40CFR§60.4243(c)]

11.4.4. Owners and operators of stationary SI natural gas fired engines may operate their engines using propane for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but must keep records of such use. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the owners and operators are required to conduct a performance test to demonstrate compliance with the emission standards of §60.4233. [40CFR§60.4243(e)]

11.4.5. It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [40CFR§60.4243(g)]

11.5. Testing Requirements for Owners and Operators

11.5.1. Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.

a. Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in §60.8 and under the specific conditions that are specified by Table 2 to this subpart. [40CFR§60.4244(a)]

b. You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine. [40CFR§60.4244(b)]

c. You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour. [40CFR§60.4244(c)]

d. To determine compliance with the NO_X mass per unit output emission limitation, convert the concentration of NO_X in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \quad \text{(Eq. 1)}$$

Where:
ER = Emission rate of NO_X in g/HP-hr.

C_d= Measured NO_X concentration in parts per million by volume (ppmv).

1.912×10−3 = Conversion constant for ppm NO_X to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

[40CFR§60.4244(d)]

e. To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \quad \text{(Eq. 2)}$$

Where:
ER = Emission rate of CO in g/HP-hr.

C_d= Measured CO concentration in ppmv.

1.164×10−3 = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(e)]

e. For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \quad \text{(Eq. 3)}$$

Where:
ER = Emission rate of VOC in g/HP-hr.

C_d= VOC concentration measured as propane in ppmv.

1.833×10−3 = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

[40CFR§60.4244(f)]

f. If the owner/operator chooses to measure VOC emissions using either Method 18 of 40 CFR part 60, appendix A, or Method 320 of 40 CFR part 63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{Mi}}{C_{Ai}} \qquad \text{(Eq. 4)}$$

Where:
RF_i= Response factor of compound i when measured with EPA Method 25A.

C_{Mi}= Measured concentration of compound i in ppmv as carbon.

C_{Ai}= True concentration of compound i in ppmv as carbon.

$$C_{icorr} = RF_i \times C_{imeas} \qquad \text{(Eq. 5)}$$

Where:
C_{icorr}= Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

C_{imeas}= Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{Peq} = 0.6098 \times C_{icorr} \qquad \text{(Eq. 6)}$$

Where:
C_{Peq}= Concentration of compound i in mg of propane equivalent per DSCM.

[40CFR§60.4244(g)]

11.6. Notification, Reports, and Records for Owners and Operators

11.6.1. Owners or operators of stationary SI ICE must meet the following notification, reporting and recordkeeping requirements.

a. Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section.

1. All notifications submitted to comply with this subpart and all documentation supporting any notification.
2. Maintenance conducted on the engine.
3. If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90 and 1048.
4. If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

[40CFR§60.4245(a)]

b. For all stationary SI emergency ICE greater than or equal to 500 HP manufactured on or after July 1, 2010, that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. For all stationary SI emergency ICE greater than or equal to 130 HP and less than 500 HP manufactured on or after July 1, 2011 that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. For all stationary SI emergency ICE greater than 25 HP and less than 130 HP manufactured on or after July 1, 2008, that do not meet the standards applicable to non-emergency engines, the owner or operator of must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. [40CFR§60.4245(b)]

c. Owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in §60.4231 must submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of this section.

1. Name and address of the owner or operator;
2. The address of the affected source;
3. Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;
4. Emission control equipment; and
5. Fuel used.

[40CFR§60.4245(c)]

d. Owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed. [40CFR§60.4245(d)]

12.0. Source-Specific Requirements (40CFR63 Subpart ZZZZ Requirements, EPCE-1 – EPCE-12)

12.1. Limitations and Standards

12.1.1. *Stationary RICE subject to Regulation under 40 CFR Part 60.* 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.

The permittee meets the criteria of paragraph (c)(1), which is for a new or reconstructed stationary RICE located at an area source. The permittee must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subparts IIII and JJJJ.
[40 C.F.R. § 63.6590(c)]

13.0. Source-Specific Requirements (40CFR60 Subpart OOOO Requirements, EPCE-1 – EPCE-12)

13.1. Limitations and Standards

13.1.1. You must comply with the standards in paragraphs (a) through (d) of this section for each reciprocating compressor affected facility.

a. You must replace the reciprocating compressor rod packing according to either paragraph (a)(1) or (2) of this section.

(1) Before the compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning upon initial startup of your reciprocating compressor affected facility, or October 15, 2012, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.
[40 CFR §60.5385(a)(1)]

(2) Prior to 36 months from the date of the most recent rod packing replacement, or 36 months from the date of startup for a new reciprocating compressor for which the rod packing has not yet been replaced.
[40 CFR §60.5385(a)(2)]

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.

Signature[1] (please use blue ink) _____ Responsible Official or Authorized Representative _____ Date

Name & 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 U.S. EPA); or

d. The designated representative delegated with such authority and approved in advance by the Director.

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2913A
Plant ID No.:	051-00145
Applicant:	Appalachian Midstream Services, L.L.C.
Facility Name:	Sand Hill Compressor Station
Location:	Near Dallas, Marshall County
SIC/NAICS Code:	1382/213112
Application Type:	Modification
Received Date:	September 14, 2015
Engineer Assigned:	Joe Kessler
Fee Amount:	$4,500
Date Received:	September 9, 2015 ($1,000) September 21, 2015 ($2,500) October 21, 2015 ($1,000)
Complete Date:	October 30, 2015
Due Date:	January 28, 2016
Applicant's Ad Date:	September 11, 2015
Newspaper:	*Intelligencer*
UTM's:	Easting: 537.993 km Northing: 4,426.286 km Zone: 17
Latitude/Longitude:	39.98754/-80.55586
Description:	After-the-fact modification to: (1) reduce the CO and VOC control efficiencies claimed for the oxidation catalysts, (2) increase the associated potential-to-emit (PTE) of the compressor engines, and (3) revise the potential emissions from the glycol dehydration units (GDUs), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations.

On July 23, 2012, Appalachian Midstream Services, L.L.C. (AMS), a subsidiary of Williams (note that "Williams" is also the parent company of "Williams Ohio Valley Midstream, LLC"), was issued Permit Number R13-2913 for the construction of the Sand Hill Compressor Station located in a rural area of Marshall County approximately 2.50 miles southwest of Dallas, WV.

DESCRIPTION OF PROCESS

Existing Facility

The existing Sand Hill Station receives natural gas from surrounding wells via pipelines and separates, dehydrates, and compresses the gas before sending it via pipeline to other facilities for further processing or distribution. The facility consists of twelve (12) 1,380 horsepower (hp) Caterpillar G3516B 4-stroke lean burn (4SLB) Compressor Engines, three (3) 55 mmscf/day triethylene glycol (TEG) dehydration units (GDU), two (2) 0.50 mmBtu/hr heater treaters, one (1) 600 kW_e Capstone C600 NG Microturbine Generator, and ten (10) storage tanks.

Proposed Modifications

AMS has now submitted a permit application to:

- Reduce the control efficiencies claimed for the oxidation catalysts (see Table 1);

Table 1: Change in Oxidation Catalyst Control Percentages

Pollutant	Old (%)	New (%)
CO	98.00	84.90
NO_x	None	None
VOC[(1)]	80.00	75.00
VOC (True)	84.03	80.27
Formaldehyde	94.87	94.87

(1) Represents NMNEHC emissions not including Formaldehyde.

- Increase the associated PTE of the compressor engines (EUCE-1 through EUCE-12);
- Revise the potential emissions from the GDUs (EUDHY-1 through EUDHY-3), fugitives, and compressor blowdowns using an updated site-specific gas analysis as input into the emissions calculations; and
- Lower the aggregate condensate throughput of the storage tanks (EUTK-1 through EUTK-8) and the truck loading (EULOAD-1) from 9,965,000 to 2,252,000 gallons per year.

Post-Modification Process Description

The natural gas inlet stream from surrounding area wells enters the facility at low pressure through a two phase low pressure inlet separator that will gravity separate the inlet stream into two streams: gas and produced liquids. Low pressure inlet gas will be compressed via twelve (12) 1,380 hp Caterpillar G3516B 4SLB Compressor Engines (EUCE-1 through EUCE-12). The compressor engines are each controlled (CO, VOCs, and formaldehyde) by an EMIT Technologies Model ELH-3550-1416F-4CE0-241 oxidation catalyst. Discharge from the compressors will pass through filter/coalescer separators to remove any condensed or entrained liquids present. After the inlet gas

passes through the compressors, it goes through the glycol dehydration process before exiting the facility via a sales pipeline. A portion of the discharge gas will be removed prior to outlet metering for use as fuel gas.

Three (3) 55 mmscf/day TEG GDUs (EUDHY-1 through EUDHY-3) are used to remove water from the gas. The units are comprised of both a glycol contactor skid and glycol regeneration skid. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The "rich" glycol contacting water goes to the glycol reboiler where heat is used to remove the water and regenerate the glycol. The heat for each GDU is supplied by a 1.0 mmBtu/hr natural gas/waste gas-fired reboiler (EPRBL-1 through EPRBL-3) that exhausts to the atmosphere. Overhead still column emissions from the glycol regeneration skid will be controlled by an air cooled condenser. The non-condensables from the still column overheads will be routed to the reboiler and burned with 98% destruction efficiency. Flash tank off-gases from the glycol regeneration skid will also be routed to the reboiler to be burned as fuel with 98% destruction efficiency. The TEG reboilers are equipped with a burner management system to ensure a constant flame for combustion of the vapors. Any excess vapors not burned as fuel will be recycled/recompressed.

After dehydration, fuel gas is pulled from the discharge side of the process. A fuel gas skid reduces the pressure of a portion of the discharge gas to a pressure suitable for use by fuel burning equipment. Pertaining to the fuel gas skid, there is no hydrocarbon liquid recovery by design.

Inlet liquids will flow from the two phase low pressure inlet separator to one of two (2) 0.5 mmBtu/hr natural gas-fired heater treater feed drums (EUHT-1 and EUHT-2); which is a three phase low pressure separator. Heater Treaters are used to treat emulsions, which are stable mixtures of condensate, solids, and water. These units use thermal, gravitational, mechanical, and sometimes chemical methods to break the emulsions and separate the condensate from water. Elevating the emulsion temperature is particularly effective in lowering condensate viscosity and promoting phase separation. Heavy liquids (water) will be transported off site via truck. Liquid hydrocarbon (condensates) will flow from the feed drum to the heater treater. Any vapors evolved from the liquid to the feed drum will be routed to the electric driven flash gas compressor and recycled to the two phase low pressure inlet separator. After stabilization, condensate will be sent to one of the 16,800 gallon atmospheric condensate storage tanks (EUTK-1 through EUTK-8). Produced condensate will be transported off site via truck. Vapors evolved from truck loading (both produced water and condensate) will be captured and routed to an activated carbon canister (EULOAD-1 and EULOAD-2).

The facility will contain several liquid recycle streams to reduce emissions. All high pressure liquids will be cascaded to lower pressure separators to capture gases evolved as a result of pressure reduction. All liquids formed by gas cooling in the inter-stage coolers of the three stage reciprocating compressors will be cascaded to lower pressure scrubbers on the compressor skid.

The facility will also contain several gas recycle streams. All atmospheric tank emissions will be controlled by vapor recovery compression. The vapor recovery compressors will discharge in the flash gas compressor. The flash gas compressor will compress these gases and discharge into the two phase low pressure inlet separator. Overhead gases from the heater treater feed drum and heater treater will also be routed to the flash gas compressor and recycled to the two phase low pressure inlet separator.

The 600 kW_e Capstone C600 NG Microturbine Generator provides electric power to the vapor recovery and flash gas compressors, electric glycol pumps, and other electrical equipment. Fugitive emissions from component leaks also occur.

SITE INSPECTION

Due to the nature of the proposed modification, a site inspection by the writer was deemed as not necessary. On September 9, 2015, a site inspection of the Sand Hill Compressor Station was conducted by Mr. James Robertson of the DAQ Compliance/Enforcement (C/E) Section. This inspection found the facility be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

AMS included in Attachment N of the permit application air emissions calculations for the equipment and processes at the Sand Hill Compressor Station. The following will summarize the calculation methodologies used by AMS to calculate the PTE of only those emission units being modified in the permitting action evaluated herein.

Compressor Engines

Potential emissions from each of the twelve (12) 1,380 hp Caterpillar G3516B 4SLB Compressor Engines (EUCE-1 through EUCE-12) were based on (revised, see Table 1) post-control emission factors provided by the oxidation catalyst vendor, the engine vendor, and as given in AP-42, Section 3.2 (AP-42 is a database of emission factors maintained by USEPA). Hourly emissions were based on the (as calculated using a fuel heat rating of 8,984 Btu/hp-hr) maximum design heat input (MDHI) of the engines of 12.40 mmBtu/hr and the maximum hp rating. Annual emissions were based on 8,760 hours of operation per year. A higher heating value of 1,324 Btu/scf was used in the calculations. The following table details the PTE of each compressor engine:

Table 2: Per-Compressor Engine PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO[(1)]	0.45 g/hp-hr (controlled)	Catalyst Vendor	1.36	5.96
NO_X	0.50 g/hp-hr	Engine Vendor	1.52	6.66
$PM_{2.5}/PM_{10}/PM$[(2)]	9.91×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.12	0.54
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Table 3.2-2	0.01	0.03
VOCs[(1)]	0.29 g/hp-hr (controlled)	Catalyst Vendor	0.88	3.86
Total HAPs	Various	AP-42, Table 3.2-2	0.29	1.25
Formaldehyde[(1)]	0.02 g/hp-hr (controlled)	Catalyst Vendor	0.06	0.27

(1) Based on post-control emission factor provided by the catalytic converter vendor. VOC emission factor is the sum of the both NMNEHC and HCHO emission factors.

(2) Includes condensables.

Glycol Regenerator Column/GDU Flash Tank Emissions

Revised uncontrolled VOC and Hazardous Air Pollutant (HAP) emissions from the glycol regenerator still vent and GDU flash tank are based on the emissions calculation program GRI-GLYCalc Version 4.0. GRI-GLYCalc is a well-known program for estimating air emissions from glycol units using TEG. Included in the application is a copy of the appropriate GLY-Calc analysis sheets. A site specific representative gas analysis taken on February 26, 2015 was used to provide updated inputs to GLY-Calc and was included in the permit application. As noted above, the GDUs are designed and operated so that vapors from both the still vent and the flash tank are sent to the flame zone of the reboiler and used as a fuel. The reboiler is designed with a flame burner management system so that a flame is always present when vapors are being sent to the unit. Additionally, any excess gases from the flash tank not used as a fuel in the reboiler is recycled and sent back to the station inlet for reprocessing. Based on these redundant design features, controlled emissions from the GDU still vent/flash tank were based on a 98% destruction and removal efficiency (DRE) of hydrocarbons in the associated reboilers (with a 10% safety factor applied).

Condensate Storage Tanks

AMS provided a revised estimate (based on lower throughput) of the uncontrolled emissions produced from the eight (8) condensate storage tanks (EPTK-1 through ETK-8) using the TANKS 4.09d program (working/breathing losses) as provided under AP-42, Section 7 and using ProMax Simulation Software (flashing losses). ProMax software is a chemical process simulator for design and modeling of amine gas treating, glycol dehydration units, and other natural gas components. As stated above, the uncontrolled emissions are captured and recycled by the plants VRU system (with a maximum as-monitored 2% downtime (175 hours) as authorized under Permit Number R13-2913. Emissions were based on an aggregate condensate throughput of 2,520,000 gallons per year.

Condensate Truck Loading

Air emissions from revised condensate truck loading operations (based on lower throughput) occur as fugitive emissions generated by displacement of vapors when loading trucks. The uncontrolled emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-1. In this equation, CNX used variables specific to the condensate loaded and to the method of loading - in this case "submerged filling - dedicated normal service." Based on the use of the VRU compressor, and according to guidance in AP-42, Section 5.2-1, a control efficiency of 70% was applied to the uncontrolled condensate loading emissions. The captured loading vapors are routed to an activated carbon canister for a control of 95%. Therefore, the overall control efficiency of the uncontrolled truck loading emissions is 66.5% as authorized under Permit Number R13-2913. Additionally, worst-case annual emissions were based on a maximum loading of 2,520,000 gallons of condensate. Maximum hourly emission rates were based on loading a maximum of 15,120 gallons of condensate per hour.

Fugitives

Equipment Leaks

AMS based their revised 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 (VOCs). No control efficiencies, as based on a Leak Detection and Repair (LDAR) protocol, were applied. Component counts were based on as-built numbers at the facility. VOC by-weight percentages (gas ~ 23%, light oil ~ 79%) of the natural gas/condensate were also used in the calculations and is based on a site-specific gas/oil analysis taken on February 26, 2015.

Compressor Blowdowns

AMS also included in their fugitive emission estimate a number of compressor blowdowns where natural gas is released for emergency or maintenance purposes. The calculations were based on a release of 1,793,500 scf of natural gas per year (based on 10 blowdowns per engine during the first month of operation and 8 blowdowns/engine-month after). The VOC by-weight percentage (23%) of the natural gas was also used in the calculations and is based on a site-specific gas analysis taken on February 26, 2015.

Emissions Summary

Based on the above revised estimation methodologies, the post-modification PTE of the Sand Hill Compressor Station is given in Tables 1a through 1d in Attachment N of the permit application. The change in annual facility-wide PTE (only pollutants that changed are listed) as a result of the after-the-fact modifications evaluated herein is given in the following table:

Table 3: Change In Facility-Wide Annual PTE

Pollutant	R13-2913[1]		R13-2913A		Change	
	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
CO	3.13	13.74	17.19	75.30	14.06	61.56
VOCs	12.52	81.93	15.66	94.46	3.14	12.53
HAPs	3.81	16.69	3.87	16.41	0.06	-0.28

(1) Emissions taken from R13-2913 Fact Sheet.
(2) All particulate matter emissions are assumed to be less than 2.5 microns. Includes condensables.

REGULATORY APPLICABILITY

The Sand Hill Compressor Station is subject to the following substantive state and federal air quality rules and regulations: 45CSR2, 45CSR6, 45CSR13, 40 CFR 60 Subparts JJJJ and OOOO, and 40 CFR 63, Subparts HH and ZZZZ. The following will discuss only the potential or actual regulatory applicability of rules to the emission units that have been proposed to be substantively modified as part of this permitting action.

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 modification of the Sand Hill Compressor Station has a potential to emit in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant (see Table 3) and, therefore, pursuant to §45-13-2.17, the proposed changes are defined as a "modification" under 45CSR13.

Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the . . . modification . . . and operation of any stationary source to be commenced without . . . obtaining a permit to . . . modify." Therefore, AMS is required to obtain a permit under 45CSR13 for the proposed changes.

As required under §45-13-8.3 ("Notice Level A"), AMS 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 11, 2015 in the *Intelligencer* and the affidavit of publication for this legal advertisement was submitted on October 9, 2015.

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

The Sand Hill Compressor Station is located in Marshall County, WV. Marshall County is classified as "in attainment" with all National Ambient Air Quality Standards except for, in certain tax districts, SO_2. The Franklin Tax District, where the Sand Hill facility is *not* located, is classified as "non-attainment" for SO_2. 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 Table 3, the facility-wide PTE of the proposed Sand Hill Compressor Station is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 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 calculated from Table 2 above, the aggregate PTE of formaldehyde generated by the compressor engines is greater than 0.5 TPY - greater than the 1,000 pound per year threshold given in Table A of 45CSR27. However, internal combustion engines do no 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 modified Sand Hill 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 Table 3) 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 two New Source Performance Standard (NSPS) - 40 CFR 60, Subpart JJJJ and Subpart OOOO - and two Maximum Achievable Control Technology (MACT) rules - 40 CFR 63, Subpart ZZZZ and 40 CFR 63, Subpart HH, the facility would, in most cases, be subject to Title V as a "deferred source." However, pursuant to §60.4230(c), §60.5370(c),

§63.6585(d), and §63.760(h) as a non-major "area source," Antero is not required to obtain a Title V permit for the proposed facility. Therefore, the Sand Hill Compressor Station is not subject to 45CSR30.

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

AMS's twelve (12) Caterpillar G3516 4SLB 1,380 hp compressor engines are defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and are each, pursuant to §60.4230(a)(4)(i), 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 AMS's compressor engines are greater than 100 hp, each engine must comply with the emission standards under Table 1 for "Non-Emergency SI ICE ≥ 500 hp manufactured after July 1, 2010:" NO_x - 1.0 g/HP-hr, CO - 2.0 g/HP-hr, and VOC - 0.7 g/HP-hr. The emission standards and the proposed compliance therewith of the engines are given in the following table:

Table 4: Caterpillar G3616 Subpart JJJJ Compliance

Pollutant	Standard (g/HP-hr)	Uncontrolled Emissions (g/bhp)(1)	Control Percentage	Controlled Emissions (g/bhp)(1)	JJJJ Compliant?
NO_x	1.0	0.50	0.00%	0.50	Yes
CO	2.0	2.98	84.90%	0.45	Yes
VOC	0.7	1.08	75.00%	0.27	Yes

(1) Based on the EMIT Technologies, Inc. Model ELH-3550-1416F-4CE0-241 oxidation catalyst specification sheet included in the permit application. Pursuant to Subpart JJJJ, compliance with VOC emissions do not include CH_2O emission factors.

The Caterpillar G3516B is not a "certified" engine under Subpart JJJJ so AMS will have to show compliance with the emission standards pursuant to §60.4243(b)(2)(ii): conducting an initial performance test and thereafter conducting subsequent performance testing every 8,760 hours or 3 years, whichever comes first, to demonstrate compliance. Performance testing requirements are given under §60.4244 of Subpart JJJJ. AMS will additionally have to meet all applicable monitoring, recording, and record-keeping requirements under Subpart JJJJ.

40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

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.

Compressor Engines

Pursuant to §60.5365(c), "[e]ach reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment" that is constructed after August 23, 2011 is subject to the applicable provisions of Subpart OOOO. As the Sand Hill Compressor Station is located before the point of custody transfer, the compressor engines are applicable to Subpart OOOO. The substantive requirements for the engines are given under §60.5385(a): the engines' "rod packing" must replaced according to the given schedule and the engine must meet applicable MRR given under §60.5410(c), §60.5415(c), and §60.5420(b)(1).

40 CFR 63 Subpart HH: National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart HH. Pursuant to §63.760(a)(3), as the Sand Hill Compressor Station - an area source of HAPs (see Table 3) - "process[es], upgrade[s], or store[s] natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user," it is defined as an area source subject to the applicable provisions under Subpart HH.

Pursuant to §63.760(b)(2), each TEG GDU located at an area source that meets the requirements under §63.760(a)(3) is defined as an affected facility under Subpart HH. The requirements for affected sources at area sources are given under §63.764(d). However, for a GDU, exemptions to these requirements are given under §63.764(e): if (1) "actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters [3 mmscf/day] per day" or (2) "actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram [1 TPY] per year."

Information in the permit application indicates the the maximum aggregate PTE of benzene emissions from each GDU is less than 1 TPY. Therefore, the GDUs are exempt from the Subpart HH requirements given under §63.764(d).

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 Sand Hill Compressor Station is defined as an area source of HAPs (see Table 3), 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 engines proposed for the Sand Hill Compressor Station are each 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 existing Sand Hill 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 (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). 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 identified by AMS as emitted in substantive amounts at Sand Hill and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 5: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Acetaldehyde	VOC	Yes	B2 - Probable Human Carcinogen
Acrolein	VOC	No	Inadequate Data
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
Methanol	VOC	No	No Assessment Available
n-Hexane	VOC	No	Inadequate Data
Benzene	VOC	Yes	Category A - Known Human Carcinogen
Toluene	VOC	No	Inadequate Data

HAPs	Type	Known/Suspected Carcinogen	Classification
Ethylbenzene	VOC	No	Category D - Not Classifiable
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects 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

Due to the nature of the modification, no changes in the monitoring, compliance demonstration, and reporting, record-keeping requirements (MRR) were made.

PERFORMANCE TESTING OF OPERATIONS

Due to the nature of the modification, no changes in the performance testing requirements were made.

CHANGES TO PERMIT R13-2913

The substantive changes made changes to R13-2913 were limited to:

- The CO and VOC emission limits of the compressor engines in Section 5.1.2 of the draft permit were revised;
- The emission limits of the GDU still vent in Section 5.1.2 of the draft permit were revised;

- Additional language was added under 7.1.8. of the draft permit to require a burner management system on the reboilers;
- A requirement limiting VRU downtime in controlling the emissions from the storage tanks was added to Section 9.1.2. of the draft permit;
- Truck loading throughput limits under Sections 10.1.1. and 10.1.2. were revised lower;
- Language from 40 CFR 63, Subpart ZZZZ was added to Section 12.0 of the draft permit; and
- Language from 40 CFR 60, Subpart OOOO was added to Section 13.0 of the draft permit.

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 R13-2913A to Appalachian Midstream Services, L.L.C. for the proposed modification of the Sand Hill Compressor Station located near near Dallas, Marshall County, WV.

Joe Kessler, PE
Engineer

3/22/16
Date

INTERNAL PERMITTING DOCUMENT TRACKING MANIFEST

Company Name Appalachian Midstream Services, LLC

Permitting Action Number R13-2913A Total Days 190 DAQ Days 144 ← SEE NOTE ON DB SHEET FOR DELAY EXPLANATION

Permitting Action:

- ○ Permit Determination
- ○ General Permit
- ○ Administrative Update
- ○ Temporary
- ○ Relocation
- ○ Construction
- ⊘ Modification
- ○ PSD (Rule 14)
- ○ NNSR (Rule 19)

Documents Attached:

- ✓ Engineering Evaluation/Memo
- ✓ Draft Permit
- ✓ Notice
- ○ Denial
- ○ Final Permit/General Permit Registration
- ⊘ Completed Database Sheet
- ○ Withdrawal
- ○ Letter
- ○ Other *(specify)* _____

Date	From	To	Action Requested
3/22/16	Joe Kessler	Bev McKeone	Notice Approval
3/29	Bev	Joe	See Comments - Publish - Send to Notice

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

APPALACHIA MIDSTREAM SERVICES, L.L.C.

Entire Document
NON-CONFIDENTIAL

SAND HILL COMPRESSOR STATION

MODIFICATION PERMIT APPLICATION

SUBMITTED TO WVDEP DIVISION OF AIR QUALITY
MARCH 2016

TABLE OF CONTENTS

INTRODUCTION

Appalachia Midstream Services, L.L.C. (AMS), operates the Sand Hill Compressor Station (Sand Hill) in Marshall County under Permit No. R13-2913 issued on July 23, 2012. AMS submitted an application in September 2015 to update emissions at the facility using a recent gas analysis and the most recent Global Warming Potential multipliers as well as decrease the carbon monoxide and volatile organic compound control efficiencies. Per the request of WVDEP, AMS is submitting this updated application as an amendment to the September 2015 application. With this application, emissions from the dehydration units (renamed from EPSTL-1, -2, -3 to EPDEHY-1, -2, -3) have been updated to account for emissions from the flash tank streams being routed to the dehydrator reboilers as fuel. The control efficiency of the flash tank streams has been revised from 100% control to 98% control. Additionally the dehydrator pump rates have been reduced to 7.5 gallons per minute in both the electric pump and gas pump scenarios. Condensate tank emissions and condensate loading emissions have also been updated to reflect a lower throughput rate of 60,000 barrels per year total.

Sand Hill is authorized to operate twelve (12) 1,380-hp Caterpillar G3516B ultra lean-burn compressor engines equipped with oxidation catalysts, one (1) 805-hp Capstone C600 microturbine generator, three (3) 55.0-MMSCFD triethylene glycol (TEG) dehydration units equipped with condenser controls, three (3) 1.0-mmBtu/hr TEG reboilers, two (2) 0.5-mmBtu/hr heater treater burners, eight (8) 400-bbl condensate storage tanks, two (2) 400-bbl produced water storage tanks, condensate and produced water truck loading, compressor blowdowns, and fugitive emissions.

Note that other storage tanks may be present on site (i.e., methanol, TEG, lube oil) but are considered de minimis sources per Table 45-13B and are not addressed further in this application.

Proposed Emissions

Emissions calculations for criteria air pollutants, hazardous air pollutants, and greenhouse gas emissions from the proposed equipment are presented in Attachment N.

Each ultra-lean-burn natural gas-fired compressor engine is equipped with an oxidation catalyst. Potential emissions were calculated using manufacturer data when available and manufacturer control efficiencies when applicable. Pollutant emissions for which no manufacturer data was available were calculated using the latest AP-42/EPA emission factors. Potential emissions from the microturbine generator were also calculated using available manufacturer data and AP-42/EPA emission factors.

Each TEG dehydration unit has a capacity of 55.0 million standard cubic feet per day (MMSCFD) and has one (1) 1.0-mmBtu/hr TEG reboiler for glycol regeneration. Each unit is equipped with a primary electric glycol pump with a maximum capacity of 22 gallons per minute (gpm). In addition, each TEG dehydration unit has two (2) gas injection glycol pumps, each with a maximum capacity of 7.5 gpm, for a total maximum capacity of 15 gpm. The pump rate will be limited to 7.5 gpm in both the electric pump and gas pump operating scenarios. Still vent vapors from each TEG dehydration unit will be controlled by an air-cooled condenser. Non-condensables from the regenerator overheads will be routed to the reboiler and burned with 98% destruction efficiency. Flash tank off-gases from each unit will be routed to their respective TEG reboiler to be burned as fuel. Any excess flash tank vapors not burned as fuel will be recycled/recompressed. As a conservative measure, emissions have been calculated using a 98% control efficiency to account for the flash gas stream routed to the reboiler as fuel. The TEG reboilers will be equipped with a burner management system to ensure a constant flame for combustion of the vapors. Potential emissions from the TEG dehydration units were based on the GRI-GLYCalc™ results for the gas pumps since the emissions were higher than those using the electric pumps. A 10% safety factor was added to GRI-GLYCalc™ results to account for potential fluctuations in gas composition. GRI-GLYCalc™ Input Summary and Aggregate Calculations reports for both the electric and gas pump scenarios are enclosed.

TEG reboiler and heater treater burner emissions were calculated using AP-42/EPA emission factors for natural gas combustion.

Working and breathing emissions from the condensate and produced water tanks were calculated using EPA TANKS 4.0.9d software. Flashing emissions were estimated using ProMax process simulation software. Emissions from the tanks are controlled by electric-driven vapor recovery compressor units. Gasoline RVP 15 was selected as representative of tank contents and used to model emissions. Although the produced water tanks are presumed to have negligible hydrocarbons, 1% of the total produced water throughput was modeled as Gasoline RVP 15 to conservatively estimate emissions.

Condensate and produced water truck loading emissions were calculated using AP-42 Section 5.2-4 Equation 1 for Petroleum Liquid Loading Losses and the physical properties of Gasoline RVP 15 from EPA TANKS 4.0.9d data.

Fugitive emissions for the facility are based on calculation methodologies presented in EPA-453/R-95-017, Protocol for Equipment Leak Emissions Estimates and a representative gas analysis.

Documentation supporting the emissions calculations, including manufacturer specification sheets, a catalyst specification sheet, GRI-GLYCalc reports, Tanks 4.09d report, and a gas analysis are included in Appendix A.

WVDEP APPLICATION FOR NSR PERMIT

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):*
Appalachia Midstream Services, L.L.C.

2. Federal Employer ID No. ***(FEIN):***
26-3678972

3. Name of facility *(if different from above):*
Sand Hill Compressor Station

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

5A. Applicant's mailing address:
P.O. Box 18312
Oklahoma City, OK 73154-0312

5B. Facility's present physical address:
From Dallas: 3 miles west on Stone Church Road, 1.3 miles south on Golden Road, east into location.

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 site is owned by the applicant.**
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
Natural Gas Compressor Station

10. North American Industry Classification System **(NAICS)** code for the facility:
213112

11A. DAQ Plant ID No. (for existing facilities only):
051-00145

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-2913

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

12A.

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

From Dallas: 3 miles west on Stone Church Road, 1.3 miles south on Golden Road, then east into location.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
N/A	**Dallas**	**Marshall**
12.E. UTM Northing (KM): **4,426.286**	12F. UTM Easting (KM): **537.993**	12G. UTM Zone: **17S**

13. Briefly describe the proposed change(s) at the facility:
AMS requests to update emissions at the facility using a recent gas analysis and the most recent Global Warming Potential multipliers as well as decrease the carbon monoxide and volatile organic compound control efficiencies. Emissions from the dehydration units (renamed from EPSTL-1, -2, -3 to EPDEHY-1, -2, -3) have been updated to account for emissions from the flash tank streams being routed to the dehydrator reboilers as fuel. The control efficiency of the flash tank streams has been revised from 100% control to 98% control. Additionally the dehydrator pump rates have been reduced to 7.5 gallons per minute in both the electric pump and gas pump scenarios. Condensate tank emissions and condensate loading emissions have also been updated to reflect a lower throughput rate of 60,000 barrels per year total.

14A. Provide the date of anticipated installation or change:	14B. Date of anticipated Start-Up if a permit is granted:
– If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: 02/26/2015 (gas analysis date)	**N/A**

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:
Facility: Hours Per Day **24** Days Per Week **7** Weeks Per Year **52**

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known)*. A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known)*. Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) .
– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence). **¼ mile**

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

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

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

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

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

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

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

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

☒ General Emission Unit, specify: Engines, Turbine, TEG Dehydration Units, Heater Treaters, and Blowdowns

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

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

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☒ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

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

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

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

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

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

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

☐ **YES** ☒ **NO**

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

Section III. Certification of Information

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

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

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

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

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

Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE Paul Hunter DATE: 3/15/2016

(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: **Paul Hunter**		35C. Title: General Manager, Ohio River Supply Hub
35D. E-mail: Paul.Hunter@williams.com	36E. Phone: 412-787-5561	36F. FAX:
36A. Printed name of contact person (if different from above): David Morris		36B. Title: Environmental Specialist
36C. E-mail: Dave.Morris@williams.com	36D. Phone: 304-843-3125	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

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

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

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

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

ATTACHMENT A: BUSINESS REGISTRATION CERTIFICATE

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
APPALACHIA MIDSTREAM SERVICES, L.L.C.
900 PENNSYLVANIA AVE
CHARLESTON, WV 25302-3548

BUSINESS REGISTRATION ACCOUNT NUMBER: **2222-3681**

This certificate is issued on: **06/30/2010**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with W.Va. Code § 11-12.

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

This certificate is not transferrable and must be displayed at the location for which issued.

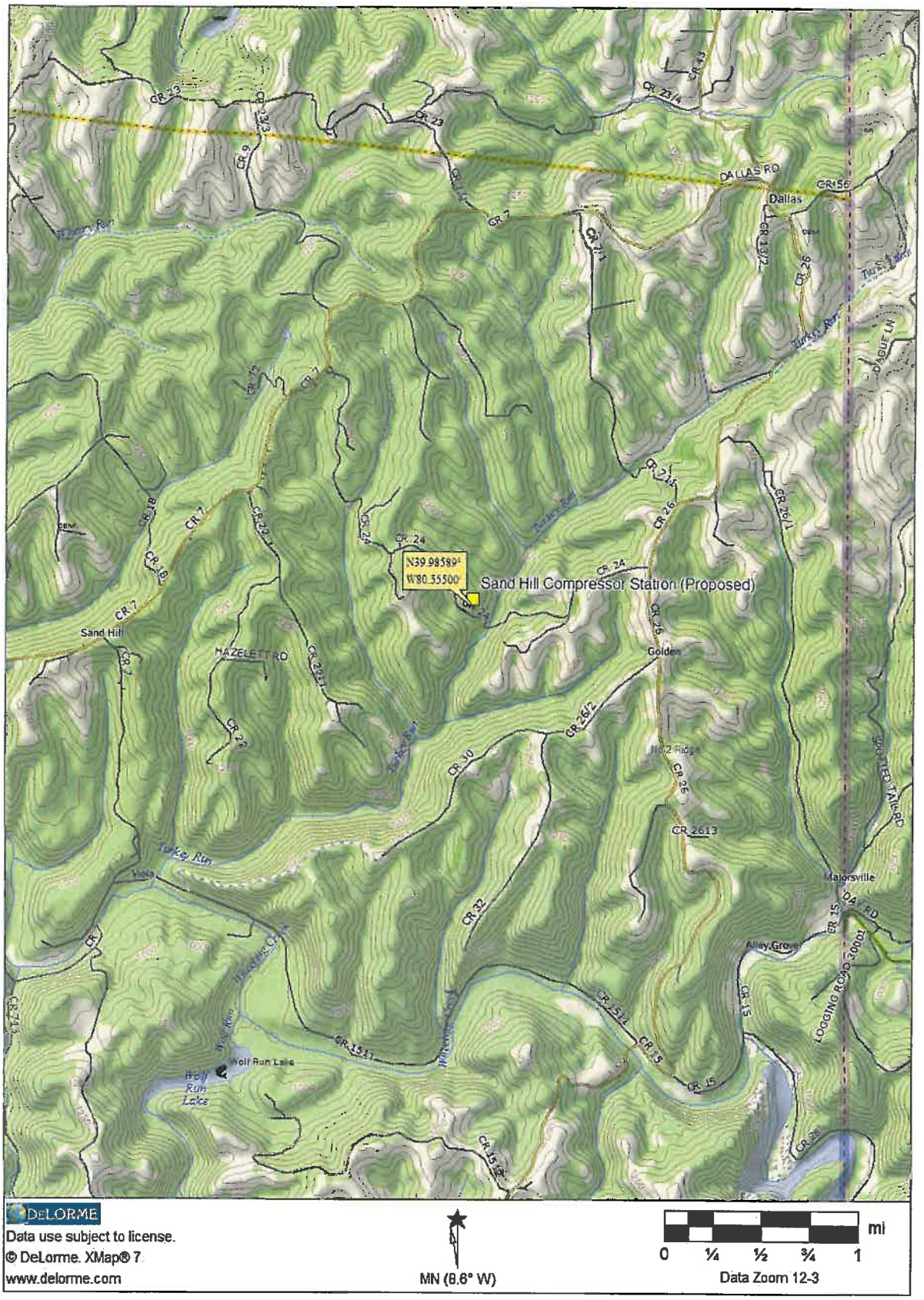
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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

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

atL006 v.1
L0250854144

ATTACHMENT B: MAP



Sand Hill Compressor Station
Figure 1: Area Map
Marshall County, West Virginia
March 2016

ATTACHMENT C: INSTALLATION/START-UP SCHEDULE

No new equipment is proposed with this application.

ATTACHMENT D: REGULATORY DISCUSSION

STATE

45 CSR 13 - 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:

Potential emissions associated with the project are more than the minor source construction permit thresholds of 6 pounds per hour (pph) AND 10 tons per year (tpy) of any regulated air pollutant OR 144 pounds per day (ppd) of any regulated air pollutant OR 2 pph OR 5 tpy of aggregated hazardous air pollutants (HAP) OR 45 CSR 27 toxic air pollutant (TAP) (10% increase if above BAT triggers or increase to Best Available Technology (BAT) triggers) OR subject to applicable Standard or Rule.

45 CSR 22 - AIR QUALITY MANAGEMENT FEE PROGRAM:

The facility is required to maintain a valid Certificate to Operate on the premises.

45 CSR 30 - REQUIREMENTS FOR OPERATING PERMITS:

Emissions from the facility do not exceed major source thresholds; therefore, this rule does not apply.

FEDERAL

40 CFR PART 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

The affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. The 400-bbl tanks at this facility were constructed after the effective date of this subpart but are less than 75 m^3 (which equals approximately 471 bbl); therefore, this subpart does not apply.

40 CFR PART 60 SUBPART KKK - STANDARDS OF PERFORMANCE FOR STATIONARY FOR EQUIPMENT LEAKS OF VOC FROM ONSHORE NATURAL GAS PROCESSING PLANTS:

This subpart sets standards for natural gas processing plants, which are defined as any site engaged in the extraction of natural gas liquids from field gas, fractionation of natural gas liquids, or both. The proposed facility is not a natural gas processing plant; therefore, this Subpart is not applicable.

40 CFR PART 60 SUBPART IIII - STANDARDS OF PERFORMANCE FOR STATIONARY COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES:

The facility does not contain the affected source (diesel-fired engine) and is therefore not subject to this Subpart.

40 CFR PART 60 SUBPART JJJJ - STANDARDS OF PERFORMANCE FOR STATIONARY SPARK IGNITION INTERNAL COMBUSTION ENGINES:

The 1,380-hp Caterpillar G3516B compressor engines are four-stroke, lean-burn natural gas-fired spark ignition (SI) internal combustion engines that were manufactured after July 1, 2010 and are therefore subject to Stage 2 emissions standards in this subpart. AMS will comply with all applicable requirements.

40 CFR PART 60 SUBPART KKKK - STANDARDS OF PERFORMANCE FOR STATIONARY COMBUSTION TURBINES:

This subpart establishes emission standards and compliance schedules for the control of emissions from 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, that commenced construction, modification, or reconstruction after February 18, 2005. The 805-hp Capstone C600 Microturbine generator has a heat input less than 10-mmBtu/hr and is therefore not subject to this subpart.

40 CFR PART 63 SUBPART HH - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM OIL AND NATURAL GAS PRODUCTION FACILITIES:

The site is a minor (area) source of hazardous air pollutants. Even though the TEG dehydration units at this facility are considered affected sources, they will be exempt from the requirements of § 63.764(d)(2) since the actual average emissions of benzene from each glycol dehydration unit process vent to the atmosphere will be less than 0.90 Mg (1.0 TPY), as determined by the

procedures specified in § 63.772(b)(2). However, the facility must maintain records of the de minimis determination as required in § 63.774(d)(1).

40 CFR PART 63 SUBPART HHH - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM NATURAL TRANSMISSION AND STORAGE FACILITIES:

The facility is not a natural gas transmission and storage facility and is therefore not subject to this Subpart.

40 CFR PART 63 SUBPART ZZZZ - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - AREA SOURCE:

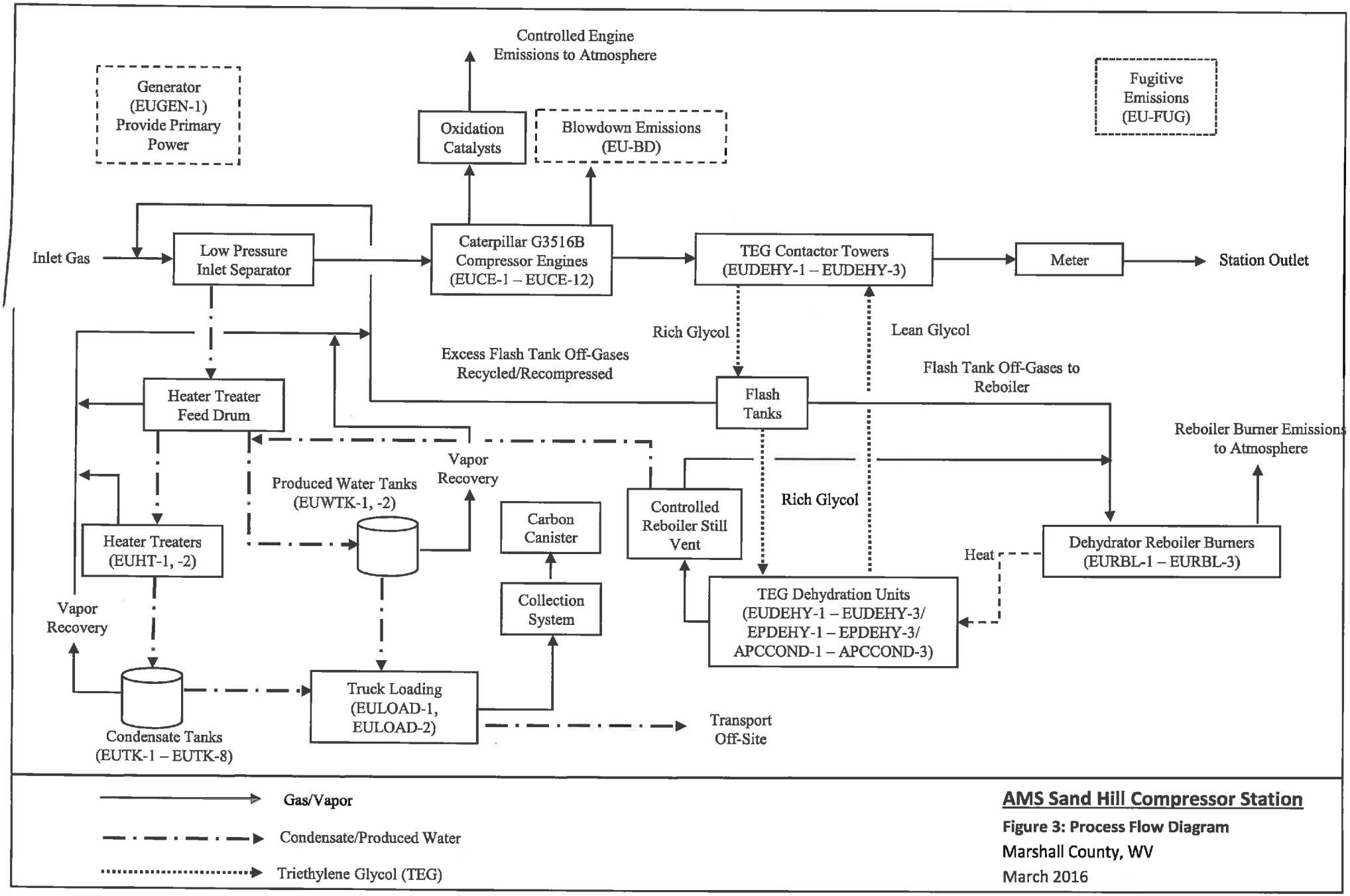
The original rule, published on February 26, 2004, initially affected new (constructed or reconstructed after December 19, 2002) reciprocating internal combustion engines (RICE) with a site-rating greater than 500 brake horsepower (HP) located at a major source of HAP emissions. On January 18, 2008, EPA published an amendment that promulgated standards for RICE constructed or reconstructed after June 12, 2006 with a site rating less than or equal to 500 HP located at major sources, and for engines constructed and reconstructed after June 12, 2006 located at area sources. On August 10, 2010, EPA published another amendment that promulgated standards for existing (constructed or reconstructed before June 12, 2006) RICE at area sources and existing RICE (constructed or reconstructed before June 12, 2006) with a site rating of less than or equal to 500 HP at major sources.

Owners and operators of new or reconstructed engines at area sources must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines). Based on emission calculations, this facility is a minor source of HAP. The 1,380-hp, four-stroke, lean-burn stationary RICE were constructed after the June 12, 2006 effective date for new stationary RICE at area sources and are subject to this subpart. The engines meet the requirements of this subpart by compliance with Subpart JJJJ. No further requirements apply for these engines under this subpart.

ATTACHMENT E: PLOT PLAN

A plot plan was previously submitted for this facility. No equipment changes are included in this application.

ATTACHMENT F: PROCESS FLOW DIAGRAM



AMS Sand Hill Compressor Station

Figure 3: Process Flow Diagram

Marshall County, WV

March 2016

ATTACHMENT G: PROCESS DESCRIPTION

A description of the facility process is as follows: The natural gas inlet stream from surrounding area wells enters the facility at low pressure through a two-phase low pressure inlet separator that will gravity separate the inlet stream into two streams: gas and hydrocarbon/water liquids. Low-pressure inlet gas is compressed via three-stage reciprocating compressors with interstage cooling. Discharge from the compressors passes through filter/coalescer separators to remove any condensed or entrained liquids present. After the inlet gas passes through compressors, it goes through the dehydration process before exiting the facility via a sales pipeline. A portion of the discharge gas will be removed prior to outlet metering for use as fuel gas.

Triethylene glycol (TEG) dehydration units are used to remove water from the gas. The units are comprised of both a glycol contactor skid and a glycol regeneration skid. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The "rich" glycol containing water goes to the glycol reboiler where heat is used to remove the water and regenerate the glycol. The heat is supplied by a natural gas-fired reboiler that exhausts to the atmosphere. Overhead still column emissions from the glycol regeneration skid are controlled by an air-cooled condenser. The non-condensables from the still column overheads are routed to the reboiler and burned with 98% destruction efficiency. Flash tank off-gases from the glycol regeneration skid are also routed to the reboiler to be burned as fuel with 98% destruction efficiency. The TEG reboilers are equipped with a burner management system to ensure a constant flame for combustion of the vapors. Any excess vapors not burned as fuel are recycled/recompressed.

After dehydration, fuel gas is pulled from the discharge side of the process. A fuel gas skid (not an emission source) reduces the pressure of a portion of the discharge gas to a pressure suitable for use by fuel-burning equipment. Pertaining to the fuel gas skid, there is no hydrocarbon liquid recovery by design.

Inlet liquids flow from the two-phase low-pressure inlet separator to a heater-treater feed drum, a three-phase low pressure separator. Heavy liquids (water) are separated and sent to atmospheric produced water storage tanks. Produced water is transported off site via truck. Liquid hydrocarbons (condensate) flows from the feed drum to the heater treater. Any vapors evolved from the liquid to the feed drum are routed to the electric-driven flash gas compressor and recycled to the two-phase low pressure inlet separator. After stabilization, condensate is sent to atmospheric condensate storage tanks. Produced condensate is transported off site via truck. Vapors evolved from truck loading (both produced water and condensate) are captured and routed to an activated carbon canister with at least 95% control efficiency.

The facility contains several liquid recycle streams to reduce emissions. All high pressure liquids are cascaded to lower pressure separators to capture gases evolved as a result of pressure reduction. All liquids formed by gas cooling in the inter-stage coolers of the three-stage reciprocating compressors are cascaded to lower pressure scrubbers on the compressor skid.

The facility will also contain several gas recycle streams. All atmospheric tank emissions are controlled by vapor recovery compression. The vapor recovery compressors discharge in the flash gas compressor. The flash gas compressors compress these gases and discharge into the two-phase low pressure inlet separator. Overhead gases from the heater treater feed drum and heater treater are also routed to the flash gas compressor and recycled to the two-phase low pressure inlet separator.

The generator provides electric power to the vapor recovery and flash gas compressors, electric glycol pumps, and other electrical equipment. Fugitive emissions from component leaks also occur.

Please note that the compressor station has two primary suction pressure operating points, 125 psig and 50 psig. The discharge pressure range is 900 – 1,200 psig. The facility initially operates at 125 psig suction pressure and will continue to do so until such time that field production volumes decline. At that time, the suction pressure will be lowered to 50 psig, resulting in a diminished facility capacity.

ATTACHMENT H: MATERIAL SAFETY DATA SHEETS (MSDS)

MSDS were previously submitted.

ATTACHMENT I: EMISSION UNITS TABLE

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
EUCE-1	EPCE-1	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-2	EPCE-2	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-3	EPCE-3	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-4	EPCE-4	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-5	EPCE-5	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-6	EPCE-6	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-7	EPCE-7	Caterpillar G3516B Engine	2014	1,380-hp	Modification	Oxid. Cat.
EUCE-8	EPCE-8	Caterpillar G3516B Engine	2014	1,380-hp	Modification	Oxid. Cat.
EUCE-9	EPCE-9	Caterpillar G3516B Engine	2014	1,380-hp	Modification	Oxid. Cat.
EUCE-10	EPCE-10	Caterpillar G3516B Engine	TBD	1,380-hp	Modification	Oxid. Cat.
EUCE-11	EPCE-11	Caterpillar G3516B Engine	TBD	1,380-hp	Modification	Oxid. Cat.
EUCE-12	EPCE-12	Caterpillar G3516B Engine	TBD	1,380-hp	Modification	Oxid. Cat.
EUGEN-1	EPGEN-1	Capstone C600 Microturbine Generator	2012	805-hp	N/A	N/A
EUDEHY-1	EPDEHY-1	TEG Dehydration Unit Still Vent	2012	55.0-MMSCFD	Modification	APCCOND-1
EUDEHY-1	EPRBL-1	TEG Reboiler	2012	1.0-mmBtu/hr	N/A	N/A
EUDEHY-2	EPDEHY-2	TEG Dehydration Unit Still Vent	2014	55.0-MMSCFD	Modification	APCCOND-2
EUDEHY-2	EPRBL-2	TEG Reboiler	2014	1.0-mmBtu/hr	N/A	N/A
EUDEHY-3	EPDEHY-3	TEG Dehydration Unit Still Vent	TBD	55.0-MMSCFD	Modification	APCCOND-3
EUDEHY-3	EPRBL-3	TEG Reboiler	TBD	1.0-mmBtu/hr	N/A	N/A

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]
EUHT-1	EPHT-1	Heater Treater Burner	2012	0.5-mmBtu/hr	N/A	N/A
EUHT-2	EPHT-2	Heater Treater Burner	TBD	0.5-mmBtu/hr	N/A	N/A
EUTK-1	EPTK-1	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-2	EPTK-2	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-3	EPTK-3	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-4	EPTK-4	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-5	EPTK-5	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-6	EPTK-6	Condensate Storage Tank	2012	400-bbl	Modification	Vapor Recovery Unit
EUTK-7	EPTK-7	Condensate Storage Tank	TBD	400-bbl	Modification	Vapor Recovery Unit
EUTK-8	EPTK-8	Condensate Storage Tank	TBD	400-bbl	Modification	Vapor Recovery Unit
EUWTK-9	EPWTK-9	Produced Water Storage Tank	2012	400-bbl	N/A	Vapor Recovery Unit
EUWTK-10	EPWTK-10	Produced Water Storage Tank	2012	400-bbl	N/A	Vapor Recovery Unit
EULOAD-1	EPLOAD-1	Condensate Truck Loading	2012	2,520,000 gal/yr	Modification	APC-CARBTROL
EULOAD-2	EPLOAD-2	Produced Water Truck Loading	2012	1,533,000 gal/yr	N/A	APC-CARBTROL
EU-FUG	EP-FUG	Fugitive Emissions	2012	N/A	Modification	N/A
EU-BD	EP-BD	Blowdown Emissions	2012	N/A	Modification	N/A

TBD = To be determined

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

ATTACHMENT J: EMISSION POINTS DATA SUMMARY SHEET

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table-& Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentration [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EPCE-1	Upward vertical stack	EUCE-1	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-2	Upward vertical stack	EUCE-2	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			

EPCE-3	Upward vertical stack	EUCE-3	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-4	Upward vertical stack	EUCE-4	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-5	Upward vertical stack	EUCE-5	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			

EPCE-6	Upward vertical stack	EUCE-6	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-7	Upward vertical stack	EUCE-7	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-8	Upward vertical stack	EUCE-8	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			

EPCE-9	Upward vertical stack	EUCE-9	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-10	Upward vertical stack	EUCE-10	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-11	Upward vertical stack	EUCE-11	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	9.07	39.71	1.36	5.96			
								VOC	3.29	14.39	0.82	3.60			
								PM_{TOT}	0.12	0.54	0.12	0.54			
								SO_2	0.01	0.03	0.01	0.03			
								Acetaldehyde	0.10	0.45	0.10	0.45			
								Acrolein	0.06	0.28	0.06	0.28			
								Benzene	0.01	0.02	0.01	0.02			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.19	5.20	0.06	0.27			
								n-Hexane	0.01	0.06	0.01	0.06			
								Methanol	0.03	0.14	0.03	0.14			
								Toluene	0.01	0.02	0.01	0.02			
								Xylenes	<0.01	0.01	<0.01	0.01			
								CO_2	1,566.80	6,862.58	1,566.80	6,862.58			
								CH_4	0.03	0.12	0.03	0.12			
								N_2O	<0.01	0.01	<0.01	0.01			

EPCE-12	Upward vertical stack	EUCE-12	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx CO VOC PM_{TOT} SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	1.52 9.07 3.29 0.12 0.01 0.10 0.06 0.01 <0.01 1.19 0.01 0.03 0.01 <0.01 1,566.80 0.03 <0.01	6.66 39.71 14.39 0.54 0.03 0.45 0.28 0.02 <0.01 5.20 0.06 0.14 0.02 0.01 6,862.58 0.12 0.01	1.52 1.36 0.82 0.12 0.01 0.10 0.06 0.01 <0.01 0.06 0.01 0.03 0.01 <0.01 1,566.80 0.03 <0.01	6.66 5.96 3.60 0.54 0.03 0.45 0.28 0.02 <0.01 0.27 0.06 0.14 0.02 0.01 6,862.58 0.12 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPGEN-1	Upward vertical stack	EPGEN-1	Microturbine Generator	-	None	-	-	NOx CO VOC PM_{TOT} SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	0.25 0.62 0.02 0.05 0.03 <0.01 <0.01 <0.01 <0.01 0.01 - - <0.01 <0.01 880.15 0.02 <0.01	1.09 2.70 0.07 0.22 0.11 <0.01 <0.01 <0.01 <0.01 0.02 - - <0.01 <0.01 3,855.04 0.08 0.01	-	-	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPDEHY-1	Upward vertical stack	EUDEHY-1	Glycol Dehydrator Still Vent and Flash Tank	APCCOND-1	Condenser/Reboiler	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	66.97 0.48 0.04 0.00 0.08 1.65 0.35 96.76	293.33 2.10 0.20 0.00 0.37 7.25 1.53 423.80	1.29 <0.01 <0.01 0.00 <0.01 0.03 0.01 2.13	5.67 0.01 <0.01 0.00 <0.01 0.13 0.03 9.32	Gas/Vapor	O (GRI GLYCalc)	-

EPRBL-1	Upward vertical stack	EUDEHY-1	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{TOT} SO_2 n-Hexane Formaldehyde Benzene Toluene CO_2 CH_4 N_2O	0.08 0.06 <0.01 0.01 <0.01 <0.01 <0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.33 0.28 0.02 0.03 <0.01 0.01 <0.01 <0.01 <0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPDEHY-2	Upward vertical stack	EUDEHY-2	Glycol Dehydrator Still Vent and Flash Tank	APCCOND-2	Condenser/Reboile r	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	66.97 0.48 0.04 0.00 0.08 1.65 0.35 96.76	293.33 2.10 0.20 0.00 0.37 7.25 1.53 423.80	1.29 <0.01 <0.01 0.00 <0.01 0.03 0.01 2.13	5.67 0.01 <0.01 0.00 <0.01 0.13 0.03 9.32	Gas/Vapor	O (GRI GLYCalc)	-
EPRBL-2	Upward vertical stack	EUDEHY-2	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{TOT} SO_2 n-Hexane Formaldehyde Benzene Toluene CO_2 CH_4 N_2O	0.08 0.06 <0.01 0.01 <0.01 <0.01 <0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.33 0.28 0.02 0.03 <0.01 0.01 <0.01 <0.01 <0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPDEHY-3	Upward vertical stack	EUDEHY-3	Glycol Dehydrator Still Vent and Flash Tank	APCCOND-3	Condenser/Reboile r	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	66.97 0.48 0.04 0.00 0.08 1.65 0.35 96.76	293.33 2.10 0.20 0.00 0.37 7.25 1.53 423.80	1.29 <0.01 <0.01 0.00 <0.01 0.03 0.01 2.13	5.67 0.01 <0.01 0.00 <0.01 0.13 0.03 9.32	Gas/Vapor	O (GRI GLYCalc)	-

EPRBL-3	Upward vertical stack	EUDEHY-3	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{TOT} SO_2 n-Hexane Formaldehyde Benzene Toluene CO_2 CH_4 N_2O	0.08 0.06 <0.01 0.01 <0.01 <0.01 <0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.33 0.28 0.02 0.03 <0.01 0.01 <0.01 <0.01 <0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPHT-1	Upward vertical stack	EUHT-1	Hot Oil Heater	-	-	-	-	NOx CO VOC PM_{TOT} SO_2 n-Hexane CO_2 CH_4 N_2O	0.04 0.03 <0.01 <0.01 <0.01 <0.01 58.49 <0.01 <0.01	0.17 0.14 0.01 0.01 <0.01 <0.01 256.18 <0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPHT-2	Upward vertical stack	EUHT-2	Hot Oil Heater	-	-	-	-	NOx CO VOC PMTOT SO_2 n-Hexane CO_2 CH_4 N_2O	0.04 0.03 <0.01 <0.01 <0.01 <0.01 58.49 <0.01 <0.01	0.17 0.14 0.01 0.01 <0.01 <0.01 256.18 <0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPTK-1 – EPTK-8	Tank Vent	EUTK-1 – EUTK-8	Eight (8) 400-bbl Condensate Tanks	Vapor Recovery Unit	Vapor Recovery	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane	-	164.32 0.08 0.44 0.39 1.48 5.85	-	3.29 <0.01 0.01 0.01 0.03 0.12	Gas/Vapor	O (TANKS 4.0.9d)	-

EPWTK-1 – EPWTK-2	Tank Vent	EUWTK-1 – EUWTK-2	Two (2) 400-bbl Produced Water Tanks	Vapor Recovery Unit	Vapor Recovery	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane	-	90.32 0.05 0.24 0.21 0.81 3.22	-	1.81 <0.01 <0.01 <0.01 0.02 0.06	Gas/Vapor	O (TANKS 4.0.9d)	-
EPLOAD-1	Fugitive	EULOAD-1	Condensate Truck Loading	APC-CARBTROL	Carbon Canister	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	-	6.15 <0.01 0.02 0.01 0.06 0.22 <0.01 1.85	-	2.06 <0.01 0.01 <0.01 0.02 0.07 <0.01 0.62	Gas/Vapor	O (AP-42)	-
EPLOAD-2	Fugitive	EULOAD-2	Produced Water Truck Loading	APC-CARBTROL	Carbon Canister	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	-	0.04 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 0.01	-	0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01	Gas/Vapor	O (AP-42)	-
EP-FUG	Fugitive	EU-FUG	Fugitive Emissions	-	-	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	-	11.89 <0.01 <0.01 <0.01 0.01 0.26 0.09 25.52	-	-	Gas/Vapor	O (API)	-
EP-BD	Fugitive	EU-BD	Blowdown Emissions	-	-	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	-	11.88 <0.01 <0.01 0.00 <0.01 0.24 0.10 27.73	-	-	Gas/Vapor	O (API)	-

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

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EPCE-1	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-2	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-3	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-4	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-5	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-6	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-7	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-8	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-9	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-10	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-11	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPCE-12	1.0	1,012	9,240	195.8	~1,100	20 (est.)	4,426.286	537.993
EPSTL-1	N/A	212	N/A	N/A	~1,100	N/A	4,426.286	537.993

Emission Point ID No. *(Must match Emission Units Table*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EPRBL-1	~1.3	350 – 400	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPSTL-2	N/A	212	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPRBL-2	~1.3	350 – 400	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPSTL-3	N/A	212	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPRBL-3	~1.3	350 – 400	N/A	N/A	~1,100	N/A	4,426.286	537.993
EP-HT-1	0.7	~450	N/A	N/A	~1,100	N/A	4,426.286	537.993
EP-HT-2	0.7	~450	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPTK-1 – EPTK-8	N/A	Ambient	N/A	N/A	~1,100	20	4,426.286	537.993
EPWTK-1 – EPWTK-2	N/A	Ambient	N/A	N/A	~1,100	20	4,426.286	537.993
EPLOAD-1	N/A	Ambient	N/A	N/A	~1,100	N/A	4,426.286	537.993
EPLOAD-2	N/A	Ambient	N/A	N/A	~1,100	N/A	4,426.286	537.993
EP-FUG	N/A	Ambient	N/A	N/A	~1,100	N/A	4,426.286	537.993
EP-BD	N/A	Ambient	N/A	N/A	~1,100	20 (est.)	4,426.286	537.993

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

ATTACHMENT K: FUGITIVE EMISSIONS DATA SUMMARY SHEET

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

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

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads						
Unpaved Haul Roads						
Storage Pile Emissions						
Loading/Unloading Operations - Condensate	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	Does not apply	6.15 <0.01 0.02 0.01 0.06 0.22 <0.01 1.85	Does not apply	2.06 <0.01 0.01 <0.01 0.02 0.07 <0.01 0.62	O – AP-42
Loading/Unloading Operations – Produced Water	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	Does not apply	0.04 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 0.01	Does not apply	<0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01	O – AP-42
Wastewater Treatment Evaporation & Operations						

Equipment Leaks	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	Does not apply	11.89 <0.01 <0.01 <0.01 0.01 0.26 0.09 25.52	Does not apply	N/A	O – AP-42
General Clean-up VOC Emissions						
Other						

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

Note: Greenhouse Gas (GHG) emissions were calculated using EPA Mandatory Reporting Rule and 2009 API Compendium guidance. With the exception of fugitive emissions (which are calculated by mass balance), emissions calculation methodologies are intended to calculate metric tons (tonnes) for the purposes of emissions reporting to EPA. These values were converted to tons for consistency with other pollutants.

ATTACHMENT L: EMISSION UNIT DATA SHEETS

EUDS - General: Compressor Engines

EUDS - General: Microturbine

EUDS - General: Dehydration Units

EUDS - General: Heater Treater Burners

EUDS - Storage Tanks – Condensate

EUDS - Bulk Liquid Transfer Operations - Condensate

EUDS - General: Blowdowns

EUDS - Chemical Process (Leak Sources)

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*): See below

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

   This form applies to twelve (12) identical 1,380-hp Caterpillar G3516B Compressor Engine w/ Oxidation Catalysts (EUCE-1 through EUCE-12)

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:

   Emissions provided in Question 8. Each unit will operate a maximum of 8,760 hours per year.

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

   Emissions provided in Question 8.

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

   Emissions from the combustion of natural gas.

* 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 is used for fuel (Estimated maximum of 8,984 Btu per horsepower-hour for 8,760 hours per year at maximum horsepower rating, which equals 82.03 million cubic feet per year per unit at 1,324 Btu per standard cubic foot. Actual fuel heating value may vary.

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

Gas analyses attached.

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

@ °F and psia.

(d) Percent excess air:

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

(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:

Not applicable

(g) Proposed maximum design heat input: 12.40 × 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:

@ 1,012 °F and 14.7 psia

a.	NO_X	1.52	lb/hr	grains/ACF
b.	SO_2	0.01	lb/hr	grains/ACF
c.	CO	9.07	lb/hr	grains/ACF
d.	PM_{10}	<0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	3.29	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	1.41	lb/hr	grains/ACF
	Note: Emissions shown are per unit. Speciated HAPs and Greenhouse Gases presented in Attachment J.		lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING	RECORDKEEPING
5.1.16. Requirements for Use of Catalytic Reduction Devices *The permittee shall monitor the temperature to the inlet of the catalyst and, in accordance with manufacturer's specifications, a high temperature alarm shall shut off the engine before thermal deactivation of the catalyst occurs. If the engine shuts off due to high temperature, the permittee shall also check for thermal deactivation of the catalyst before normal operations are resumed. At least once per calendar quarter, the permittee shall conduct strip checks of NO_x and CO emissions from the engines when operating under representative conditions for that period. Strip checks shall be conducted using the following procedure:* *i. Samples of pollutant concentrations should be taken from sample ports in the stack or using a "Shepherd's hook" from a location in the stack such that a representative concentration is measured and bias (e.g., air leakage at weep holes) is prevented. The use of stainless steel tubing ran from sampling site to ground level may be used. A single sampling location near the center of the duct may be selected.* *ii. The emissions check should produce at least one test strip of concentration data for each of O_2, NO, NO_2 and CO. The analyzer should be run for a minimum of 5 minutes to allow readings to stabilize. Then run analyzer for 5 minutes and verify stability in concentrations. Print a representative test strip on the analyzer.* *iii. With this test strip include (when available) unit number or lease name, rpm, manifold pressure, compressor suction and discharge pressures and any other information that may help determine horsepower during test.* *iv. Records of the strip checks must be maintained.*	As required by NSPS Subpart JJJJ

REPORTING	TESTING
As required by NSPS Subpart JJJJ	As required by NSPS Subpart JJJJ

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

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

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

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

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

Not applicable.

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*): EUGEN-1

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

   805-hp Capstone C600 Microturbine Generator

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:

   Emissions provided in Question 8. Unit will operate a maximum of 8,760 hours per year.

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

   Emissions provided in Question 8.

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

   Emissions from the combustion of natural gas.

* 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 is used for fuel (Estimated maximum of 9,347 Btu per horsepower-hour for 8,760 hours per year at maximum horsepower rating, which equals 49.78 million cubic feet per year per unit at 1,324 Btu per standard cubic foot. Actual fuel heating value may vary.

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

Gas analyses attached.

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

@ °F and psia.

(d) Percent excess air:

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

(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:

Not applicable

(g) Proposed maximum design heat input: 7.52 × 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:

@ 535 °F and 14.7 psia

a.	NO_X	0.25	lb/hr	grains/ACF
b.	SO_2	0.03	lb/hr	grains/ACF
c.	CO	0.62	lb/hr	grains/ACF
d.	PM_{10}	0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.02	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	0.01	lb/hr	grains/ACF
	Note: Emissions shown are per unit. Speciated HAPs and Greenhouse Gases presented in Attachment J.		lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
None Proposed	None Proposed
REPORTING	TESTING
None Proposed	None Proposed

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

Not applicable.

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*): See below

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

   This form applies to three (3) identical triethylene glycol (TEG) dehydration units (EUDEHY-1, EUDEHY-2 and EUDEHY-3)

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:

   Emissions provided in Question 8. Each unit will process a maximum of 55.0 million standard cubic feet of natural gas per day.

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

   Emissions provided in Question 8.

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

   Emissions from the still column are formed by boiling off water and absorbed hydrocarbons from triethylene glycol. Emissions from the reboiler are from combustion of natural gas.

* 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 (including flash tank off-gas from the dehydration unit) is used for the reboiler fuel (maximum 1.0 million Btu per hour or 6.62 million cubic feet per year per reboiler based on a higher heating value of 1,324 Btu per standard cubic foot). Actual heating value may vary.

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

Gas analyses attached.

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

@ °F and psia.

(d) Percent excess air:

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

Each unit has a 1.0-mmBtu/hr natural gas-fired reboiler (EPRBL-1, EPRBL-2, EPRBL-3, respectively)

(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:

Not applicable

(g) Proposed maximum design heat input: 1.0 × 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:

@ 212 °F and 14.7 psia

a.	NO_X	0.08	lb/hr	grains/ACF
b.	SO_2	<0.01	lb/hr	grains/ACF
c.	CO	0.06	lb/hr	grains/ACF
d.	PM_{10}	<0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	293.35*	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	10.03*	lb/hr	grains/ACF
	**Dehy (EPDEHY) + reboiler (EPRBL) emissions with gas pump use.*		lb/hr	grains/ACF
	Note: Emissions shown are per unit. Speciated HAPs and Greenhouse Gases presented in Attachment J.		lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
Each of the glycol dehydration units will not exceed the following limits: a. The natural gas throughput will not exceed 55.0 MMSCFD based on an annual average. b. The lean glycol flow rate of the glycol dehydration unit will not exceed 7.5 gallons per minute. c. Still vent vapors shall be routed to an air-cooled condenser. Non-condensables from the still column overheads will be routed to the reboiler and combusted. d. Flash tank off-gases shall be routed to the reboiler and burned as fuel. Excess vapors not burned as fuel in the reboiler shall be recycled/recompressed.	AMS shall comply with all applicable requirements of 40 CFR 63 (NESHAP) Subpart HH for Oil and Natural Gas Production for each affected dehydration unit including, but not limited to, 40 CFR 63.760 through 63.775. An owner or operator of a glycol dehydration unit that meets the exemption criteria in §63.764(e)(1)(i) or §63.764(e)(1)(ii) shall maintain the records specified in §§63.774(d)(1)(i) or (d)(1)(ii), as appropriate, for that glycol dehydration unit.
REPORTING	TESTING
None Proposed	None Proposed

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

Not applicable

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*): See below

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

   This form applies to two (2) identical heater treater burners (EUHT-1 and EUHT-2).

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:

   Emissions provided in Question 8.

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

   Emissions provided in Question 8.

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

   Emissions from the combustion of natural gas.

* 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 is used for the burner fuel (maximum 0.5 million Btu per hour or 3.31 million cubic feet per year per reboiler based on a higher heating value of 1,324 Btu per standard cubic foot). Actual heating value may vary.

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

Gas analyses attached.

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

@ °F and psia.

(d) Percent excess air:

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

Each unit has a 0.5-mmBtu/hr natural gas-fired burner (EUHT-1 and EUHT-2, respectively)

(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:

Not applicable

(g) Proposed maximum design heat input: 0.5 × 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:

@ 350 – 400 °F and 14.7 psia

a.	NO_X	0.04	lb/hr	grains/ACF
b.	SO_2	<0.01	lb/hr	grains/ACF
c.	CO	0.03	lb/hr	grains/ACF
d.	PM_{10}	<0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	<0.01	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	<0.01	lb/hr	grains/ACF
			lb/hr	grains/ACF
	Note: Emissions shown are per unit. Speciated HAPs and Greenhouse Gases presented in Attachment J.		lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
None Proposed	None Proposed
REPORTING	TESTING
None Proposed	None Proposed

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

Not applicable.

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 N/A	2. Tank Name Condensate
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) EUTK-1 – EUTK-8	4. Emission Point Identification No. (as assigned on *Equipment List Form*) EPTK-1 – EPTK-8
5. Date of Commencement of Construction (for existing tanks) EUTK-1 – EUTK-6 - 2012	
6. Type of change ☒ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) Update tank throughput.	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): N/A	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400 barrels (12,600 gallons) each	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 20
10A. Maximum Liquid Height (ft) 19	10B. Average Liquid Height (ft) 10
11A. Maximum Vapor Space Height (ft) 20	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. 16,074.56 gallons (each tank, per EPA TANKS 4.0.9d)	

13A. Maximum annual throughput (gal/yr) 2,520,000 (Total for All Tanks)	13B. Maximum daily throughput (gal/day)* 6,904.11 (Total for All Tanks) *Estimated maximum only. Rolling daily throughput total not to exceed maximum annual throughput.

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
19.60 (for each tank, per EPA TANKS 4.0.9d)

15. Maximum tank fill rate (gal/min) N/A

16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
☒ Fixed Roof ☒ vertical ___ horizontal ___ flat roof ☒ cone roof ___ dome roof
___ other (describe)
☐ External Floating Roof ___ pontoon roof ___ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ___ vertical column support ___ self-supporting
☐ Variable Vapor Space ___ lifter roof ___ diaphragm
☐ Pressurized ___ spherical ___ cylindrical
☐ Underground
☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)
Refer to enclosed TANKS Summary Sheet

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ 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): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ 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** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO		
25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
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 ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

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

27. Provide the city and state on which the data in this section are based. **Refer to enclosed TANKS Summary Sheet**
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

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

34. Average daily temperature range of bulk liquid: **Refer to enclosed TANKS Summary Sheet**	
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 <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

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

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

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

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ 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 Incinerator[1]
- ☒ Other[1] (describe): Vapor Recovery Process

[1] Complete appropriate Air Pollution Control Device Sheet.

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 Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
Refer to Attachment N Emissions Calculations and enclosed TANKS Summary Sheet					

[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 *Equipment List Form*): EULOAD-1

1. Loading Area Name: Condensate Truck Loading

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
☐ Drums ☐ Marine Vessels ☐ Rail Tank Cars ☒ 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	3

4. Does ballasting of marine vessels occur at this loading area?
☐ Yes ☐ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:
Point is kept clear. Scotches are provided. Lines kept in good working order and tested periodically.

6. Are cargo vessels pressure tested for leaks at this or any other location?
☐ Yes ☒ 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	Approx. 11	Approx. 11	Approx. 11	Approx. 11
days/week	5	5	5	5
weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.		N/A					
Liquid Name		Condensate					
Max. daily throughput (1000 gal/day)		6.9					
Max. annual throughput (1000 gal/yr)		2,520					
Loading Method [1]		SUB					
Max. Fill Rate (gal/min)		Est. 250					
Average Fill Time (min/loading)		Est. 60					
Max. Bulk Liquid Temperature (°F)		80 – 100*	*Based on summer ambient temperatures in area				
True Vapor Pressure [2]		7.6845					
Cargo Vessel Condition [3]		U					
Control Equipment or Method [4]		O: Enclosed Flare					
Minimum control efficiency (%)		70% Capture Efficiency/95% Combustion Efficiency					
Maximum Emission Rate	Loading (lb/hr)	Est. 22.15					
	Annual (lb/yr)	Approx. 3,691.96 (1.85 tpy)					
Estimation Method [5]		EPA					

[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 *Air Pollution Control Device Sheets*):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 (descibe)
[5] EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)

9. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

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

MONITORING	RECORDKEEPING
Captured loading emissions shall be routed to the enclosed flare. The flare shall be operated in accordance with applicable regulations for visible emissions and have a constant pilot flame during all times waste gas could be directed to it. The pilot flame shall be continuously monitored. The loading vapors (flare stream throughput) shall be monitored using a flow meter to ensure total annual throughput is not exceeded. Each monitoring device shall be accurate to, and shall be calibrated at a frequency in accordance with, the manufacturer's specifications.	None Proposed
REPORTING	**TESTING**
None Proposed	None Proposed

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

Not applicable.

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*): EU-BD

1. Name or type and model of proposed affected source: Natural gas blowdowns
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: Emissions provided in Question 8.
4. Name(s) and maximum amount of proposed material(s) produced per hour: Emissions provided in Question 8.
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: Emissions from the release of natural gas

* 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:

Not Applicable

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

Gas analyses attached.

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

Not Applicable @ °F and psia.

(d) Percent excess air: Not Applicable

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

Not Applicable

(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:

Not Applicable

(g) Proposed maximum design heat input: Not Applicable × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	Variable	Days/Week	Variable	Weeks/Year	Variable

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

@ Ambient °F and Atmospheric psia

a.	NO_X		lb/hr	grains/ACF
b.	SO_2		lb/hr	grains/ACF
c.	CO		lb/hr	grains/ACF
d.	PM_{10}		lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	Variable lb/hr rate	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	Total HAPs	Variable lb/hr rate	lb/hr	grains/ACF
			lb/hr	grains/ACF
	Note: Short-term emission rate is highly variable. Tons per year emissions, as well as speciated HAP and GHG emissions, are presented in Attachment J.		lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
None Proposed	None Proposed
REPORTING	TESTING
None Proposed	None Proposed

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

Not Applicable

Attachment L
EMISSIONS UNIT DATA SHEET
CHEMICAL PROCESS

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

- ☐ *Emergency Vent Summary Sheet*
- ☒ *Leak Sources Data Sheet*
- ☐ *Toxicology Data Sheet*
- ☐ *Reactor Data Sheet*
- ☐ *Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)
   Components in natural gas and light liquid service (EU-FUG)

2. Standard Industrial Classification Codes (SICs) for process(es)
   1389

3. List raw materials and ☒ attach MSDSs Previously submitted
   Natural gas and condensate

4. List Products and Maximum Production and ☐ attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)
Not applicable		

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

6. Complete the *Leak Source Data Sheet* and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here.

   The facility is not a natural gas processing plant (SIC 1321) and is therefore not subject to New Source Performance Standards (NSPS) Subpart KKK requirements for a leak detection and repair (LDAR) monitoring program.

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

   In the event of an accidental spill or release, personnel will be protected, emergency response personnel will be notified and immediate steps to stop the spill or release will be implemented.

8A. Complete the *Toxicology Data Sheet* or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.

8B. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).

9. **Waste Products** - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)

9A. Types and amounts of wastes to be disposed:

9B. Method of disposal and location of waste disposal facilities:

Carrier: Phone:

9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used ☐

10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units).

circle units:	(hrs/day) (hr/batch)	(days), (batches/day), (batches/week)	(days/yr), (weeks/year)
10A. Maximum			
10B. Typical			

11. Complete a *Reactor Data Sheet* for each reactor in this chemical process.

12. Complete a *Distillation Column Data Sheet* for each distillation column in this chemical process.

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

MONITORING	RECORDKEEPING
None proposed	None proposed
REPORTING	**TESTING**
None proposed	None proposed

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 or 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 or air pollution control device.

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

Not applicable

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	light liquid VOC[6,7]	4	N/A	N/A	794
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC	931	N/A	N/A	18,704
	Light Liquid VOC	30	N/A	N/A	1,146
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC	26	N/A	N/A	1,021
	Non VOC				
Open-ended Lines[12]	VOC				
	Non-VOC				
Sampling Connections[13]	VOC				
	Non-VOC				
Compressors	VOC	12	N/A	N/A	471
	Non-VOC				
Flanges	VOC	945 (Gas + Light Liq.)	N/A	N/A	1,643
	Non-VOC				
Other	VOC				
	Non-VOC				

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

Note: Component counts shown above are estimated.

Revision 03/2007

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

   If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category "valves, gas service:" 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR 51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.

9. LIST CO, H_2S, mineral acids, NO, NO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

ATTACHMENT M: AIR POLLUTION CONTROL DEVICE SHEET

APCDS – CONDENSER

GRI-GLYCALC ™ CONDENSER CONTROL EFFICIENCY CURVES REPORTS

GRI-GLYCALC ™ CONDENSER VENT STREAMS

Attachment M
Air Pollution Control Device Sheet
(CONDENSER SYSTEM)

Control Device ID No. (must match Emission Units Table): APCCOND-1, APCCOND-2, APCCOND-3

Equipment Information and Filter Characteristics

1. Manufacturer: N/A Model No.	2. Method: ☐ Pressure condensation ☒ Temperature condensation ☐ Surface ☐ Contact ☐ Other, specify
3. Control Device Name: Condenser	
4. Provide diagram of condenser:	
5. 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.	
6. Heat exchanger area: N/A ft^3	7. Reported removal efficiency: **See attached GLYCalc Condenser Control Curve Efficiency Report** %
8. Coolant Used: Air-cooled	9. Refrigeration capacity: Ref. N/A tons
10. Composition of coolant: N/A	11. Internal operating temperature: 120 °F
12. Specific heat of coolant: N/A BTU/lb.°F, at 77°F	13. Temperature of condensation: <120 °F
Average Operation:	**Maximum Operation:**
14. Coolant Temperature: Inlet: Varies °F Outlet: <120 °F	15. Coolant Temperature: Inlet: Varies °F Outlet: <120 °F
16. Gas Temperature: Inlet: 212 °F Outlet: 120 °F	17. Gas Temperature: Inlet: 212 °F Outlet: 120 °F
18. Gas flow rate: 50.8 ft^3/min ***Regenerator Overheads Stream – Gas Pump**	19. Gas flow rate: 50.8 ft^3/min ***Regenerator Overheads Stream – Gas Pump**
20. Coolant flow rate per condenser: Type: Water: - gal/min Air: N/A ft^3/min Other: - lb/hour	21. Coolant flow rate per condenser: Type: Water: - gal/min Air: N/A ft^3/min Other: - lb/hour
22. Efficiency of condenser: **See attached GLYCalc Condenser Control Curve Efficiency Report** %	23. Efficiency of condenser: **See attached GLYCalc Condenser Control Curve Efficiency Report** %
24. Condenser surface area: N/A ft^2	25. Condenser surface area: N/A ft^2

26. Pollutant	Guaranteed Minimum Control Efficiency %	Concentration ppmv	Specific Heat BTU/lb-mol °F	Heat of Vaporation BTU/lb-mol
A VOC	N/A*	-	N/A	N/A
B Benzene	N/A*	-	0.24295	N/A
C Toluene	N/A*	-	0.26005	N/A
D Ethylbenzene	N/A*	-	0.27768	N/A
E Xylenes	N/A*	-	0.27954	N/A
F n-Hexane	N/A*	-	0.38628	N/A
G	*See Question 36			
Total Concentration in ppmv		-		

Emission Gas (Vapor) Stream

27. **Before Condenser (Regenerator Overheads)**	28. **After Condenser (Condenser Vent Stream)**
Inlet vapor flow rate: 50.8 ft³/min	Inlet vapor flow rate: 0.9 ft³/min
Influent vapor temperature: 212 °F	Influent vapor temperature: 212 °F
Effluent vapor temperature: 120 °F	Effluent vapor temperature: 120 °F

29. Pollutant	INLET* Vapor Pressure	INLET* Condensation Temperature	INLET* Rate lb/hr	OUTLET* Rate lb/hr	OUTLET* Vapor Pressure	OUTLET* Condensation Temperature
A VOC	N/A	N/A	11.10	3.46	N/A	N/A
B Benzene	N/A	N/A	0.43	0.07	N/A	N/A
C Toluene	N/A	N/A	0.04	<0.01	N/A	N/A
D Ethylbenzene	N/A	N/A	0.00	0.00	N/A	N/A
E Xylenes	N/A	N/A	0.08	<0.01	N/A	N/A
F n-Hexane	N/A	N/A	0.38	0.07	N/A	N/A
G						
Total of the POLLUTANT lb/hr			12.03	3.60		

Inlet = Regenerator Overheads Stream – Gas Pump. (See Note)
Outlet = Condenser Vent Stream – Gas Pump. Non-condensables are then combusted by reboiler for lower overall emissions.

30. Moisture content: %

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

32. Describe the collection material disposal system:
N/A

33. Have you included ***Condenser Control Device*** in the Emissions Points Data Summary Sheet? Yes

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

MONITORING:	RECORDKEEPING:
Each of the glycol dehydration units will not exceed the following limits: a. The natural gas throughput will not exceed 55.0 MMSCFD based on an annual average. b. The lean glycol flow rate of the glycol dehydration unit will not exceed 7.5 gallons per minute. c. Still vent vapors shall be routed to an air-cooled condenser. Non-condensables from the still column overheads will be routed to the reboiler and combusted. d. Flash tank off-gases shall be routed to the reboiler and burned as fuel. Excess vapors not burned as fuel in the reboiler shall be recycled/recompressed.	AMS shall comply with all applicable requirements of 40 CFR 63 (NESHAP) Subpart HH for Oil and Natural Gas Production for each affected dehydration unit including, but not limited to, 40 CFR 63.760 through 63.775. An owner or operator of a glycol dehydration unit that meets the exemption criteria in §63.764(e)(1)(i) or §63.764(e)(1)(ii) shall maintain the records specified in §§63.774(d)(1)(i) or (d)(1)(ii), as appropriate, for that glycol dehydration unit.
REPORTING:	TESTING:
None Proposed	None Proposed

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.

35. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
N/A

36. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
*Manufacturer does not guarantee control efficiency but attached specification sheet demonstrates representative efficiency. Refer to attached GLYCalc Condenser Control Curve Efficiency Report for control efficiency at various operating temperatures.

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

Note: Units will be equipped with one (1) 22 gpm electric pump and two (2) 7.5 gpm gas pumps (total = 15 gpm) to be used as back-ups. Pump rate will be limited to 7.5 gpm in each operating scenario. Emissions from the gas pumps serve as the basis for the potential emissions since they are greater than potential emissions using the electric pumps.

GRI-GLYCalc VERSION 4.0 - CONDENSER CONTROL CURVE EFFICIENCY REPORT

Case Name: Sand Hill Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Electric - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

CONDENSER CONTROL EFFICIENCY CURVES

Note: Condenser curves computed for the range 40.0 F <= T <= 170.0 F. DO NOT EXTRAPOLATE BEYOND THIS RANGE!

Temp(F)	BTEX	Total HAP	VOC
40.0	89.44	87.71	62.73
45.0	87.53	85.49	61.11
50.0	85.21	82.77	59.33
55.0	82.61	79.73	57.58
60.0	79.76	76.39	55.87
65.0	76.66	72.79	54.19
70.0	73.35	68.95	52.54
75.0	69.87	64.93	50.95
80.0	66.25	60.80	49.40
85.0	62.54	56.60	47.91
90.0	58.79	52.42	46.49
95.0	55.05	48.31	45.13
100.0	51.35	44.32	43.84
105.0	47.72	40.49	42.63
110.0	44.20	36.86	41.49
115.0	40.79	33.44	40.43
120.0	37.52	30.24	39.44
125.0	34.38	27.27	38.51
130.0	31.38	24.50	37.65
135.0	28.51	21.93	36.83
140.0	25.77	19.55	36.05
145.0	23.15	17.33	35.27
150.0	20.64	15.27	34.48
155.0	18.04	13.19	33.55
160.0	15.67	11.33	32.49
165.0	13.31	9.52	31.09
170.0	10.95	7.75	29.05

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Sand Hill Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Electric - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

CONDENSER VENT STREAM

Temperature: 52.00 deg. F
Pressure: 14.08 psia
Flow Rate: 8.12e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e+000	5.35e-002
Carbon Dioxide	1.82e+000	1.72e-001
Nitrogen	7.45e-002	4.47e-003
Methane	1.42e+001	4.87e-001
Ethane	2.72e+001	1.75e+000
Propane	2.67e+001	2.52e+000
Isobutane	4.48e+000	5.58e-001
n-Butane	1.57e+001	1.95e+000
Isopentane	2.36e+000	3.64e-001
n-Pentane	3.36e+000	5.19e-001
n-Hexane	7.24e-001	1.34e-001
Cyclohexane	3.01e-001	5.42e-002
Other Hexanes	8.97e-001	1.65e-001
Heptanes	8.44e-002	1.81e-002
Methylcyclohexane	1.91e-001	4.01e-002
2,2,4-Trimethylpentane	2.51e-003	6.14e-004
Benzene	5.46e-001	9.13e-002
Toluene	1.16e-002	2.29e-003
Xylenes	5.11e-003	1.16e-003
C8+ Heavies	8.52e-003	3.11e-003
Total Components	100.00	8.89e+000

GRI-GLYCalc VERSION 4.0 - CONDENSER CONTROL CURVE EFFICIENCY REPORT

Case Name: Sand Hill Compressor Station - Gas Pumps
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Gas - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

CONDENSER CONTROL EFFICIENCY CURVES

Note: Condenser curves computed for the range 40.0 F <= T <= 170.0 F. DO NOT EXTRAPOLATE BEYOND THIS RANGE!

Temp(F)	BTEX	Total HAP	VOC
40.0	90.83	89.53	73.19
45.0	89.21	87.65	71.94
50.0	87.38	85.53	70.69
55.0	85.36	83.19	69.45
60.0	83.29	80.79	68.30
65.0	80.90	78.02	67.08
70.0	78.32	75.05	65.86
75.0	75.57	71.90	64.66
80.0	72.67	68.59	63.47
85.0	69.64	65.16	62.29
90.0	66.50	61.63	61.14
95.0	63.28	58.06	60.02
100.0	60.01	54.47	58.92
105.0	56.70	50.90	57.85
110.0	53.39	47.38	56.81
115.0	50.09	43.94	55.81
120.0	46.82	40.59	54.85
125.0	43.59	37.36	53.92
130.0	40.42	34.24	53.02
135.0	37.31	31.24	52.15
140.0	34.25	28.37	51.29
145.0	31.26	25.62	50.43
150.0	28.32	22.97	49.55
155.0	25.42	20.42	48.59
160.0	22.57	17.96	47.47
165.0	19.49	15.36	45.98
170.0	16.55	12.92	43.96

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Sand Hill Compressor Station - Gas Pumps
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Gas - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

CONDENSER VENT STREAM

Temperature: 52.00 deg. F
Pressure: 14.08 psia
Flow Rate: 5.57e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e+000	3.68e-002
Carbon Dioxide	9.19e-001	5.94e-002
Nitrogen	1.29e-001	5.30e-003
Methane	2.82e+001	6.65e-001
Ethane	2.57e+001	1.13e+000
Propane	2.21e+001	1.43e+000
Isobutane	3.52e+000	3.00e-001
n-Butane	1.14e+001	9.75e-001
Isopentane	1.81e+000	1.92e-001
n-Pentane	2.45e+000	2.60e-001
n-Hexane	5.52e-001	6.99e-002
Cyclohexane	2.59e-001	3.20e-002
Other Hexanes	6.69e-001	8.47e-002
Heptanes	7.84e-002	1.15e-002
Methylcyclohexane	1.79e-001	2.58e-002
2,2,4-Trimethylpentane	2.24e-003	3.75e-004
Benzene	6.26e-001	7.18e-002
Toluene	1.29e-002	1.74e-003
Xylenes	5.86e-003	9.14e-004
C8+ Heavies	1.13e-002	2.83e-003
Total Components	100.00	5.36e+000

ATTACHMENT N: SUPPORTING EMISSIONS CALCULATIONS

EXAMPLE CALCULATIONS

g/hp-hr Emission Factors:

Emission Factor (g/hp-hr) * Engine Rating (hp) * 1 lb/453.6 g = lb/hr

lb/mmBtu Emission Factors:

Emission Factor (lb/mmBtu) * Engine Rating (hp) * Fuel Use (Btu/hp-hr) * 1 mmBtu/1000000 Btu = lb/hr

Emission Factor (lb/mmBtu) * Combustor Rating (mmBtu/hr) = lb/hr

lb/mmscf Emission Factors:

Emission Factor (lb/mmscf) * Heater Rating (mmBtu/hr) * 1/Fuel Heating Value (Btu/scf) = lb/hr

kg/mmBtu Emission Factors:

Emission Factor (kg/mmBtu) * Engine Rating (hp) * Fuel Use (Btu/hp-hr) * 2.20462 lb/kg * 1 mmBtu/1000000 Btu = lb/hr

Emission Factor (kg/mmBtu) * Heater Rating (mmBtu/hr) * 2.20462 lb/kg = lb/hr

Fugitives:

TOC Emission Factor (lb/hr/source) * Number of Sources * VOC wt% = lb/hr VOC

Tons per Year (TPY) Conversion:

lb/hr * Hours/Year * 1 ton/2000 lb = TPY

Tonnes/Year * 1.10231131 = TPY

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 1a: Summary of Criteria Air Pollutant Emissions

Equipment	Point ID	NOx		CO		VOC		SO_2		PM	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-1*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-2*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-3*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-4*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-5*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-6*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-7*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-8*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-9*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-10*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-11*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-12*	*1.52*	*6.66*	*1.36*	*5.96*	*0.88*	*3.86*	*0.01*	*0.03*	*0.12*	*0.54*
805-hp Capstone C600 Microturbine Generator	EPGEN-1	0.25	1.09	0.62	2.70	0.02	0.07	0.03	0.11	0.05	0.22
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-1*	-	-	-	-	*1.29*	*5.67*	-	-	-	-
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-2*	-	-	-	-	*1.29*	*5.67*	-	-	-	-
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-3*	-	-	-	-	*1.29*	*5.67*	-	-	-	-
1.0-mmBtu/hr TEG Reboiler	EPRBL-1	0.08	0.33	0.06	0.28	<0.01	0.02	<0.01	<0.01	0.01	0.03
1.0-mmBtu/hr TEG Reboiler	EPRBL-2	0.08	0.33	0.06	0.28	<0.01	0.02	<0.01	<0.01	0.01	0.03
1.0-mmBtu/hr TEG Reboiler	EPRBL-3	0.08	0.33	0.06	0.28	<0.01	0.02	<0.01	<0.01	0.01	0.03
0.5-mmBtu/hr Heater Treater Burner	EPHT-1	0.04	0.17	0.03	0.14	<0.01	0.01	<0.01	<0.01	<0.01	0.01
0.5-mmBtu/hr Heater Treater Burner	EPHT-2	0.04	0.17	0.03	0.14	<0.01	0.01	<0.01	<0.01	<0.01	0.01
Eight (8) Condensate Storage Tanks - Revise	*EPTK-1 - EPTK-8*	-	-	-	-	*0.75*	*3.29*	-	-	-	-
Two (2) Produced Water Storage Tanks	EPWTK-1 - EPWTK-2	-	-	-	-	0.41	1.81	-	-	-	-
Condensate Truck Loading - Revise	*EPLOAD-1*	-	-	-	-	-	*2.06*	-	-	-	-
Produced Water Truck Loading	EPLOAD-2	-	-	-	-	-	0.01	-	-	-	-
Fugitive Emissions - Revise	*EP-FUG*	-	-	-	-	-	*11.89*	-	-	-	-
Blowdowns - Revise	*EP-BD*	-	-	-	-	-	*11.88*	-	-	-	-
Revised Total =		**18.80**	**82.37**	**17.19**	**75.30**	**15.66**	**94.46**	**0.11**	**0.50**	**1.56**	**6.84**
Currently Permitted Total =		**18.80**	**82.35**	**3.13**	**13.74**	**12.52**	**81.93**	**0.11**	**0.50**	**1.55**	**6.78**
Change in Emissions =		**0.00**	**0.02**	**14.06**	**61.56**	**3.14**	**12.53**	**0.00**	**0.00**	**0.01**	**0.05**

Note: Per Caterpillar guidance, VOC emission factor does not include formaldehyde; therefore, it has been added to this summary to calculate total VOC at the site.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 1b: Summary of Hazardous Air Pollutants

Equipment	Point ID	Estimated Emissions (lb/hr)									
		Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	Total HAPs
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-1*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-2*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-3*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-4*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-5*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-6*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-7*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-8*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-9*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-10*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-11*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-12*	*0.10*	*0.06*	*0.01*	*<0.01*	*0.06*	*0.03*	*0.01*	*0.01*	*<0.01*	*0.29*
305-hp Capstone C600 Microturbine Generator	EPGEN-1	<0.01	<0.01	<0.01	<0.01	0.01	-	-	<0.01	<0.01	0.01
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-1*	*-*	*-*	*<0.01*	*0.00*	*-*	*-*	*0.03*	*<0.01*	*#VALUE!*	*#VALUE!*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-2*	*-*	*-*	*<0.01*	*0.00*	*-*	*-*	*0.03*	*<0.01*	*#VALUE!*	*#VALUE!*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-3*	*-*	*-*	*<0.01*	*0.00*	*-*	*-*	*0.03*	*<0.01*	*#VALUE!*	*#VALUE!*
1.0-mmBtu/hr TEG Reboiler	EPRBL-1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
1.0-mmBtu/hr TEG Reboiler	EPRBL-2	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
1.0-mmBtu/hr TEG Reboiler	EPRBL-3	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
0.5-mmBtu/hr Heater Treater Burner	EPHT-1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
0.5-mmBtu/hr Heater Treater Burner	EPHT-2	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
Eight (8) Condensate Storage Tanks - Revise	*EPTK-1 - EPTK-8*	*-*	*-*	*<0.01*	*<0.01*	*-*	*-*	*0.03*	*<0.01*	*0.01*	*0.04*
Two (2) Produced Water Storage Tanks	EPWTK-1 - EPWTK-2	-	-	<0.01	<0.01	-	-	0.01	<0.01	<0.01	0.02
Condensate Truck Loading - Revise	*EPLOAD-1*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Produced Water Truck Loading	EPLOAD-2	-	-	-	-	-	-	-	-	-	-
Fugitive Emissions - Revise	*EP-FUG*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Blowdowns - Revise	*EP-BD*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Revised Total =		1.24	0.76	0.07	0.01	0.74	0.37	0.30	0.07	#VALUE!	#VALUE!
Currently Permitted Total =		1.24	0.76	0.07	0.01	0.74	0.37	0.30	0.08	0.06	3.63
Change in Emissions =		0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	#VALUE!	#VALUE!

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 1b: Summary of Hazardous Air Pollutants (Continued)

Equipment	Point ID	Estimated Emissions (tons/yr)									
		Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	Total HAPs
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-1*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-2*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-3*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-4*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-5*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-6*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-7*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-8*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-9*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-10*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-11*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-12*	*0.45*	*0.28*	*0.02*	*<0.01*	*0.27*	*0.14*	*0.06*	*0.02*	*0.01*	*1.25*
805-hp Capstone C800 Microturbine Generator	EPGEN-1	<0.01	<0.01	<0.01	<0.01	0.02	-	-	<0.01	<0.01	0.03
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-1*	-	-	*0.01*	*0.00*	-	-	*0.13*	*<0.01*	*<0.01*	*0.14*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-2*	-	-	*0.01*	*0.00*	-	-	*0.13*	*<0.01*	*<0.01*	*0.14*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-3*	-	-	*0.01*	*0.00*	-	-	*0.13*	*<0.01*	*<0.01*	*0.14*
1.0-mmBtu/hr TEG Reboiler	EPRBL-1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
1.0-mmBtu/hr TEG Reboiler	EPRBL-2	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
1.0-mmBtu/hr TEG Reboiler	EPRBL-3	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
0.5-mmBtu/hr Heater Treater Burner	EPHT-1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
0.5-mmBtu/hr Heater Treater Burner	EPHT-2	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
Eight (8) Condensate Storage Tanks - Revise	*EPTK-1 - EPTK-8*	-	-	*<0.01*	*0.01*	-	-	*0.12*	*0.01*	*0.03*	*0.16*
Two (2) Produced Water Storage Tanks	EPWTK-1 - EPWTK-2	-	-	<0.01	<0.01	-	-	0.06	<0.01	0.02	0.09
Condensate Truck Loading - Revise	*EPLOAD-1*	-	-	*<0.01*	*<0.01*	-	-	*0.07*	*0.01*	*0.02*	*0.10*
Produced Water Truck Loading	EPLOAD-2	-	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01
Fugitive Emissions - Revise	*EP-FUG*	-	-	*<0.01*	*<0.01*	-	-	*0.26*	*<0.01*	*0.01*	*0.28*
Blowdowns - Revise	*EP-BD*	-	-	*<0.01*	*<0.01*	-	-	*0.24*	*<0.01*	*<0.01*	*0.24*
Revised Total =		5.45	3.35	0.33	0.05	3.22	1.63	1.89	0.29	0.20	16.41
Currently Permitted Total =		5.43	3.34	0.33	0.06	3.22	1.62	1.94	0.37	0.35	16.69
Change in Emissions =		**0.02**	**0.01**	**0.00**	-0.04	0.00	**0.01**	**-0.05**	-0.08	-0.15	**-0.28**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 1c: Summary of Greenhouse Gas Emissions - Metric Tons Per Year (Tonnes)

Equipment	Point ID	Carbon Dioxide (CO_2)		Methane (CH_4)		Nitrous Oxide (N_2O)		Methane (CH_4) as $CO_{2\,Eq.}$		Nitrous Oxide (N_2O) as $CO_{2\,Eq.}$		Total CO_2 + $CO_{2\,Eq.}$	
		lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr	lb/hr	tonnes/yr
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-1*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-2*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-3*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-4*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-5*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-6*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-7*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-8*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-9*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-10*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-11*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-12*	*1,566.80*	*6,225.63*	*0.03*	*0.11*	*<0.01*	*0.01*	*0.68*	*2.72*	*0.81*	*3.24*	*1,568.30*	*6,231.58*
805-hp Capstone C600 Microturbine Generator	EPGEN-1	880.15	3,497.23	0.02	0.07	<0.01	0.01	0.41	1.65	0.49	1.96	881.06	3,500.84
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-1*	*0.01*	*0.03*	*2.13*	*8.46*	*-*	*-*	*53.22*	*211.45*	*-*	*-*	*53.22*	*211.48*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-2*	*0.01*	*0.03*	*2.13*	*8.46*	*-*	*-*	*53.22*	*211.45*	*-*	*-*	*53.22*	*211.48*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-3*	*0.01*	*0.03*	*2.13*	*8.46*	*-*	*-*	*53.22*	*211.45*	*-*	*-*	*53.22*	*211.48*
1.0-mmBtu/hr TEG Reboiler	EPRBL-1	*116.98*	*464.80*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.22*	*0.07*	*0.26*	*117.10*	*465.28*
1.0-mmBtu/hr TEG Reboiler	EPRBL-2	*116.98*	*464.80*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.22*	*0.07*	*0.26*	*117.10*	*465.28*
1.0-mmBtu/hr TEG Reboiler	EPRBL-3	*116.98*	*464.80*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.22*	*0.07*	*0.26*	*117.10*	*465.28*
0.5-mmBtu/hr Heater Treater Burner	EPHT-1	*58.49*	*232.40*	<0.01	<0.01	<0.01	<0.01	*0.03*	*0.11*	*0.03*	*0.13*	*58.55*	*232.64*
0.5-mmBtu/hr Heater Treater Burner	EPHT-2	*58.49*	*232.40*	<0.01	<0.01	<0.01	<0.01	*0.03*	*0.11*	*0.03*	*0.26*	*58.55*	*232.77*
Eight (8) Condensate Storage Tanks - Revise	*EPTK-1 - EPTK-8*	*0.04*	*0.14*	*1.28*	*5.07*	*-*	*-*	*31.89*	*126.73*	*-*	*-*	*31.93*	*126.88*
Two (2) Produced Water Storage Tanks	EPWTK-1 - EPWTK-2	0.02	0.09	0.78	3.08	-	-	19.40	77.10	-	-	19.43	77.19
Condensate Truck Loading - Revise	*EPLOAD-1*	*-*	*<0.01*	*-*	*0.56*	*-*	*-*	*-*	*14.05*	*-*	*-*	*-*	*14.05*
Produced Water Truck Loading	EPLOAD-2	-	<0.01	-	<0.01	-	-	-	0.09	-	-	-	0.09
Fugitive Emissions - Revise	*EP-FUG*	*-*	*0.08*	*-*	*23.15*	*-*	*-*	*-*	*578.71*	*-*	*-*	*-*	*578.80*
Blowdowns - Revise	*EP-BD*	*-*	*0.09*	*-*	*25.16*	*-*	*-*	*-*	*628.94*	*-*	*-*	*-*	*629.03*
Revised Total =		**20,149.72**	**80,964.47**	**8.79**	**83.81**	**0.04**	**0.14**	**219.78**	**2,095.08**	**10.53**	**41.97**	**20,380.03**	**82,201.52**
Currently Permitted Total =		20,769.43	82,526.87	6.28	78.60	0.04	0.14	131.86	1,650.48	10.92	43.52	20,912.21	84,220.87
Change in Emissions =		-619.71	-2,462.40	2.51	5.21	0.00	0.00	87.92	444.60	-0.39	-1.55	-532.18	-2,019.35

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 1d: Summary of Greenhouse Gas Emissions - Short Tons Per Year (Tons)

Equipment	Point ID	Carbon Dioxide (CO_2)		Methane (CH_4)		Nitrous Oxide (N_2O)		Methane (CH_4) as $CO_{2\,Eq.}$		Nitrous Oxide (N_2O) as $CO_{2\,Eq.}$		Total CO_2 + $CO_{2\,Eq.}$	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-1*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-2*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-3*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-4*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-5*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-6*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-7*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-8*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-9*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-10*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-11*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
1,380-hp Caterpillar G3516B Engine w/ Oxid. Cat. - Revise	*EPCE-12*	*1,566.80*	*6,862.58*	*0.03*	*0.12*	*<0.01*	*0.01*	*0.68*	*2.99*	*0.81*	*3.57*	*1,568.30*	*6,869.14*
805-hp Capstone C600 Microturbine Generator	EPGEN-1	880.15	3,855.04	0.02	0.08	<0.01	0.01	*0.41*	*1.82*	*0.49*	*2.16*	*881.06*	*3,857.01*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-1*	*0.01*	*0.03*	*2.13*	*9.32*	-	-	*53.22*	*233.08*	-	-	*53.22*	*233.12*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-2*	*0.01*	*0.03*	*2.13*	*9.32*	-	-	*53.22*	*233.08*	-	-	*53.22*	*233.12*
55.0-MMSCFD TEG Dehydration Unit Still Vent - Revise	*EPDEHY-3*	*0.01*	*0.03*	*2.13*	*9.32*	-	-	*53.22*	*233.08*	-	-	*53.22*	*233.12*
1.0-mmBtu/hr TEG Reboiler	EPRBL-1	*116.98*	*512.36*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.24*	*0.07*	*0.29*	*117.10*	*512.89*
1.0-mmBtu/hr TEG Reboiler	EPRBL-2	*116.98*	*512.36*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.24*	*0.07*	*0.29*	*117.10*	*512.89*
1.0-mmBtu/hr TEG Reboiler	EPRBL-3	*116.98*	*512.36*	<0.01	0.01	<0.01	<0.01	*0.06*	*0.24*	*0.07*	*0.29*	*117.10*	*512.89*
0.5-mmBtu/hr Heater Treater Burner	EPHT-1	*58.49*	*256.18*	<0.01	<0.01	<0.01	<0.01	*0.03*	*0.12*	*0.03*	*0.14*	*58.55*	*256.44*
0.5-mmBtu/hr Heater Treater Burner	EPHT-2	*58.49*	*256.18*	<0.01	<0.01	<0.01	<0.01	*0.03*	*0.12*	*0.03*	*0.14*	*58.55*	*256.44*
Eight (8) Condensate Storage Tanks - Revise	*EPTK-1 - EPTK-8*	*0.04*	*0.16*	*1.26*	*5.59*	-	-	*31.89*	*139.70*	-	-	*31.93*	*139.86*
Two (2) Produced Water Storage Tanks	EPWTK-1 - EPWTK-2	0.02	0.10	0.78	3.40	-	-	*19.40*	*84.99*	-	-	*19.43*	*85.08*
Condensate Truck Loading - Revise	*EPLOAD-1*	-	*<0.01*	-	*0.62*	-	-	-	*15.48*	-	-	-	*15.48*
Produced Water Truck Loading	EPLOAD-2	-	<0.01	-	<0.01	-	-	-	*0.09*	-	-	-	*0.09*
Fugitive Emissions - Revise	*EP-FUG*	-	*0.09*	-	*25.52*	-	-	-	*637.92*	-	-	-	*638.01*
Blowdowns - Revise	*EP-BD*	-	*0.10*	-	*27.73*	-	-	-	*693.29*	-	-	-	*693.39*
Revised Total =		**20,149.72**	**88,255.97**	**8.79**	**92.38**	**0.04**	**0.16**	**219.78**	**2,309.43**	**10.53**	**46.12**	**20,380.03**	**90,811.52**
Currently Permitted Total =		**20,769.43**	**90,970.30**	**6.28**	**86.64**	**0.04**	**0.16**	**131.86**	**1,819.35**	**10.92**	**47.82**	**20,912.21**	**92,837.47**
Change in Emissions =		**-619.71**	**-2,714.33**	**2.51**	**5.74**	**0.00**	**0.00**	**87.92**	**490.08**	**-0.39**	**-1.70**	**-532.18**	**-2,025.95**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2a(1): Engine Emissions Calculations - Criteria Air Pollutants

Equipment Information

Point ID:	EPCE-1	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr)[1]:	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr):	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760
Fuel HHV (Btu/scf):	1,324	1,324	1,324	1,324	1,324	1,324
Uncontrolled Manufacturer Emission Factors						
NOx (g/hp-hr):	0.50	0.50	0.50	0.50	0.50	0.50
CO (g/hp-hr):	2.98	2.98	2.98	2.98	2.98	2.98
VOC (g/hp-hr):	1.08	1.08	1.08	1.08	1.08	1.08
CO Control Eff. %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
VOC Control Eff. %	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Controlled Manufacturer Emission Factors[2]						
CO (g/hp-hr):	0.45	0.45	0.45	0.45	0.45	0.45
VOC (g/hp-hr):	0.27	0.27	0.27	0.27	0.27	0.27

Uncontrolled Criteria Air Pollutant Emissions

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NOx	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66
CO	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71
VOC	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39
SO_2	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
$PM_{10/2.5}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PM_{COND}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54
PM_{TOT}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2a(1): Engine Emissions Calculations - Criteria Air Pollutants (Continued)

Controlled Criteria Air Pollutant Emissions

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NOx	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66
CO	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96
VOC	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60
SO_2	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
$PM_{10/2.5}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PM_{COND}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54
PM_{TOT}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54

AP-42 Table 3.2-2 (7/2000) Emission Factors

SO_2	5.88E-04
$PM_{10/2.5}$	7.71E-05
PM_{COND}	9.91E-03
PM_{TOT}	9.99E-03

Notes:
1) 10% safety factor added to manufacturer fuel use to account for potential fluctuations in fuel heating value.
2) Oxidation Catalyst does not reduce NOx emissions.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2b(1): Engine Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPCE-1	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr)1:	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr):	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Note: No reduction taken for oxidation catalyst control on any HAP other than formaldehyde.

Uncontrolled Hazardous Air Pollutant (HAP) Emissions

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Acetaldehyde	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45
Acrolein	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28
Benzene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20
n-Hexane	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Methanol	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
Toluene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Xylenes	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Total HAPs =	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2b(1): Engine Emissions Calculations - Hazardous Air Pollutants (Continued)

Controlled Hazardous Air Pollutant (HAP) Emissions

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Acetaldehyde	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45
Acrolein	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28
Benzene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27
n-Hexane	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Methanol	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
Toluene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Xylenes	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Total HAPs =	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**

AP-42 Table 3.2-2 (7/2000) Emission Factors

Acetaldehyde	8.36E-03
Acrolein	5.14E-03
Benzene	4.40E-04
Ethylbenzene	3.97E-05
n-Hexane	1.11E-03
Methanol	2.50E-03
Toluene	4.08E-04
Xylenes	1.84E-04

Uncontrolled Formaldehyde Manufacturer Emission Factor (g/hp-hr) = 0.39
Formaldehyde Manufacturer Emission Factor (g/hp-hr) with 95% Control Efficiency = 0.02

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2c(1): Engine Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPCE-1	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr)1:	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr):	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions - Metric Tons (Tonnes)

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63
CH_4	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11
N_2O	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72
N_2O as CO_2e	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24
Total CO_2 + CO_2e	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2c(1): Engine Emissions Calculations - Greenhouse Gas Emissions (Continued)

Greenhouse Gas (GHG) Emissions - Short Tons (Tons)

Point ID:	EPCE-1		EPCE-2		EPCE-3		EPCE-4		EPCE-5		EPCE-6	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
CO_2	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58
CH_4	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12
N_2O	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99
N_2O as CO_2e	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57
Total CO_2 + CO_2e	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)

Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)

40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298

Carbon Dioxide (CO_2) Manufacturer Data (g/hp-hr) + 1% for Oxidation Catalyst = 515

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2a(2): Engine Emissions Calculations - Criteria Air Pollutants

Equipment Information

Point ID:	EPCE-7	EPCE-8	EPCE-9	EPCE-10	EPCE-11	EPCE-12
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr)[1]:	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760
Fuel HHV (Btu/scf):	1,324	1,324	1,324	1,324	1,324	1,324
Uncontrolled Manufacturer Emission Factors						
NOx (g/hp-hr):	0.50	0.50	0.50	0.50	0.50	0.50
CO (g/hp-hr):	2.98	2.98	2.98	2.98	2.98	2.98
VOC (g/hp-hr):	1.08	1.08	1.08	1.08	1.08	1.08
CO Control Eff. %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
VOC Control Eff. %	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Controlled Manufacturer Emission Factors[2]						
CO (g/hp-hr):	0.45	0.45	0.45	0.45	0.45	0.45
VOC (g/hp-hr):	0.27	0.27	0.27	0.27	0.27	0.27

Uncontrolled Criteria Air Pollutant Emissions

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NOx	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66
CO	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71	9.07	39.71
VOC	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39	3.29	14.39
SO_2	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
$PM_{10/2.5}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PM_{COND}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54
PM_{TOT}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2a(2): Engine Emissions Calculations - Criteria Air Pollutants (Continued)

Controlled Criteria Air Pollutant Emissions

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NOx	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66
CO	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96	1.36	5.96
VOC	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60	0.82	3.60
SO_2	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
$PM_{10/2.5}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PM_{COND}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54
PM_{TOT}	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54	0.12	0.54

AP-42 Table 3.2-2 (7/2000) Emission Factors

SO_2	5.88E-04
$PM_{10/2.5}$	7.71E-05
PM_{COND}	9.91E-03
PM_{TOT}	9.99E-03

Notes:
1) 10% safety factor added to manufacturer fuel use to account for potential fluctuations in fuel heating value.
2) Oxidation Catalyst does not reduce NOx emissions.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2b(2): Engine Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPCE-7	EPCE-8	EPCE-9	EPCE-10	EPCE-11	EPCE-12
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr)1:	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Note: No reduction taken for oxidation catalyst control on any HAP other than formaldehyde.

Uncontrolled Hazardous Air Pollutant (HAP) Emissions

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Acetaldehyde	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45
Acrolein	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28
Benzene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20	1.19	5.20
n-Hexane	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Methanol	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
Toluene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Xylenes	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Total HAPs =	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**	**1.41**	**6.18**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2b(2): Engine Emissions Calculations - Hazardous Air Pollutants (Continued)

Controlled Hazardous Air Pollutant (HAP) Emissions

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Acetaldehyde	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45	0.10	0.45
Acrolein	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28	0.06	0.28
Benzene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27	0.06	0.27
n-Hexane	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Methanol	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
Toluene	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Xylenes	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Total HAPs =	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**	**0.29**	**1.25**

AP-42 Table 3.2-2 (7/2000) Emission Factors

Acetaldehyde	8.36E-03
Acrolein	5.14E-03
Benzene	4.40E-04
Ethylbenzene	3.97E-05
n-Hexane	1.11E-03
Methanol	2.50E-03
Toluene	4.08E-04
Xylenes	1.84E-04

Uncontrolled Formaldehyde Manufacturer Emission Factor (g/hp-hr) = 0.39
Formaldehyde Manufacturer Emission Factor (g/hp-hr) with 95% Control Efficiency = 0.02

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2c(2): Engine Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPCE-7	EPCE-8	EPCE-9	EPCE-10	EPCE-11	EPCE-12
Make:	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar	Caterpillar
Model:	G3516B	G3516B	G3516B	G3516B	G3516B	G3516B
Design Class:	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB	4S-LB
Controls:	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.	Oxid. Cat.
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	8,984	8,984	8,984	8,984	8,984	8,984
Fuel Use (scfh):	9,364	9,364	9,364	9,364	9,364	9,364
Fuel Use (mmBtu/hr)1:	12.40	12.40	12.40	12.40	12.40	12.40
Exhaust Flow (acfm):	9,240	9,240	9,240	9,240	9,240	9,240
Exhaust Temp (°F):	1,012	1,012	1,012	1,012	1,012	1,012
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions - Metric Tons (Tonnes)

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63	1,566.80	6,225.63
CH_4	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11	0.03	0.11
N_2O	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72	0.68	2.72
N_2O as CO_2e	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24	0.81	3.24
Total CO_2+ CO_2e	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**	**1,568.30**	**6,231.58**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 2c(2): Engine Emissions Calculations - Greenhouse Gas Emissions (Continued)

Greenhouse Gas (GHG) Emissions - Short Tons (Tons)

Point ID:	EPCE-7		EPCE-8		EPCE-9		EPCE-10		EPCE-11		EPCE-12	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
CO_2	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58	1,566.80	6,862.58
CH_4	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12
N_2O	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99	0.68	2.99
N_2O as CO_2e	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57	0.81	3.57
Total CO_2 + CO_2e	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**	**1,568.30**	**6,869.14**

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)

Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)
40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298

Carbon Dioxide (CO_2) Manufacturer Data (g/hp-hr) + 1% for Oxidation Catalyst = 515

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 3a: Generator Emissions Calculations - Criteria Air Pollutants

Equipment Information

Point ID:	**EPGEN-1**
Make:	Capstone
Model:	C600
Design Class:	Turbine
Controls:	None
Horsepower (hp):	805
Fuel Use (Btu/hp-hr)[1]:	9,347
Fuel Use (scfh):	5,683
Fuel Use (mmBtu/hr):	7.52
Operating Hours:	8,760
Exhaust Temp (°F):	535
Fuel HHV (Btu/scf):	1,324

Manufacturer Emission Factors[2]

NOx (g/hp-hr):	0.14

Uncontrolled Criteria Air Pollutant Emissions

Point ID: **EPGEN-1**

Pollutant	lb/hr	tons/yr
NOx	0.25	1.09
CO	0.62	2.70
VOC	0.02	0.07
SO_2	0.03	0.11
$PM_{10/2.5}$	0.01	0.06
PM_{COND}	0.04	0.15
PM_{TOT}	0.05	0.22

AP-42 Table 3.1-1, 3.1-2a (4/2000) Emission Factors (lb/mmBtu)

CO	8.20E-02
VOC	2.10E-03
SO_2	3.40E-03
$PM_{10/2.5}$	1.90E-03
PM_{COND}	4.70E-03
PM_{TOT}	6.60E-03

Notes:
1) 10% safety factor added to manufacturer fuel use to account for potential fluctuations in fuel heating value.
2) All other pollutants calculated using AP-42 emission factors

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 3b: Generator Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPGEN-1
Make:	Capstone
Model:	C600
Design Class:	Turbine
Controls:	None
Horsepower (hp):	805
Fuel Use (Btu/hp-hr)1:	9,347
Fuel Use (scfh):	5,683
Fuel Use (mmBtu/hr):	7.52
Exhaust Temp (°F):	535
Operating Hours:	8,760
HAP Control Eff. %	0.00%

Uncontrolled Hazardous Air Pollutant Emissions

Point ID: EPGEN-1

Pollutant	lb/hr	tons/yr
Acetaldehyde	<0.01	<0.01
Acrolein	<0.01	<0.01
Benzene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Formaldehyde	0.01	0.02
Methanol	-	-
n-Hexane	-	-
Toluene	<0.01	<0.01
Xylenes	<0.01	<0.01
Total HAPs =	**0.01**	**0.03**

AP-42 Table 3.1-1, 3.1-2a (4/2000) Emission Factors (lb/mmBtu)

Acetaldehyde	4.00E-05
Acrolein	6.40E-06
Benzene	1.20E-05
Ethylbenzene	3.20E-05
Formaldehyde	7.10E-04
n-Hexane	-
Methanol	-
Toluene	1.30E-04
Xylenes	6.40E-05

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 3c: Generator Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPGEN-1
Make:	Capstone
Model:	C600
Design Class:	Turbine
Controls:	None
Horsepower (hp):	805
Fuel Use (Btu/hp-hr)1:	9,347
Fuel Use (scfh):	5,683
Fuel Use (mmBtu/hr):	7.52
Operating Hours:	8,760
Exhaust Temp (°F):	535
Fuel HHV (Btu/scf):	1,324

Greenhouse Gas (GHG) Emissions - Metric Tons (Tonnes)

Point ID: EPGEN-1

Pollutant	lb/hr	tonnes/yr
CO_2	880.15	3,497.23
CH_4	0.02	0.07
N_2O	<0.01	0.01
CH_4 as CO_2e	0.41	1.65
N_2O as CO_2e	0.49	1.96
Total CO_2 + CO_2e	**881.06**	**3,500.84**

Greenhouse Gas (GHG) Emissions - Short Tons (Tons)

Point ID: EPGEN-1

Pollutant	lb/hr	tons/yr
CO_2	880.15	3,855.04
CH_4	0.02	0.08
N_2O	<0.01	0.01
CH_4 as CO_2e	0.41	1.82
N_2O as CO_2e	0.49	2.16
Total CO_2 + CO_2e	**881.06**	**3,859.01**

CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)
40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)

Carbon Dioxide (CO_2)	53.06
Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4a: Glycol Dehydration Unit Emissions - Criteria and Hazardous Air Pollutants

Equipment Information

Parameter	Units	Value (Each)
Point ID:	-	EPDEHY-1 - EPDEHY-3
Extended Gas Analysis Date	-	2/26/2015
Maximum Throughput	MMSCFD	55.00
Operating Hours	Hours/Year	8,760
Wet Gas Temperature	°F	103
Wet Gas Pressure	psig	950
Wet Gas Water Content	lb H_2O/MMSCF	Saturated
Dry Gas Water Content	lb H_2O/MMSCF	7.00
Pump Type	Electric/Gas	Note 1
Electric Pump Lean Glycol Flow Rate	gpm	7.5
Gas Pump Lean Glycol Flow Rate	gpm	7.5
Regenerator Still Vent Controls	-	Note 2
Condenser Temperature	°F	52
Condenser Pressure	psig	14.08
Flash Tank Temperature	°F	120
Flash Tank Pressure	psig	50
Flash Tank Controls	Yes/No	Note 3
Combustion Device Efficiency	%	98%

Notes:

1) Units will be equipped with one (1) 22 gpm electric pump and two (2) 7.5 gpm gas pumps (total = 15 gpm) to be used as back-up pumps. The pump rate will be limited to 7.5 gpm for each pump scenario.

2) Each unit will be equipped with BTEX condenser for still vent emissions controls. Non-condensables (condenser vent stream) will be routed to the reboiler for combustion. Reboiler is equipped with burner management system to ensure constant flame for destruction of gases.

3) Flash tank off-gases are routed to the reboiler for combustion. Excess flash tank off-gases will be recycled/recompressed. A control efficiency of 98% was used as a conservative measure.

4) GRI-GLYCalc Input Summary and Aggregate Calculations Reports attached. 10% safety factor added to GRI-GLYCalc results to account for potential fluctuations in gas composition. Potential emissions from the gas pumps serve as the basis of emissions since they are greater then electric pump emissions.

Potential Emissions

Point ID:	EPDEHY-1 - EPDEHY-3 (Each)		EPDEHY-1 - EPDEHY-3 (Total)	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
2, 2, 4-Trimethylpentane	<0.01	<0.01	<0.01	0.01
n-Hexane	0.03	0.13	0.09	0.39
Benzene	<0.01	0.01	0.01	0.03
Toluene	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	0.00	0.00	0.00	0.00
Xylenes	#VALUE!	<0.01	#VALUE!	<0.01
Total HAPs =	**0.03**	**0.14**	**0.10**	**0.43**
Total VOC =	**1.29**	**5.67**	**3.88**	**17.00**

Appalachia Midstream Services, L.L.C.
'Sand Hill Compressor Station
Table 4a: Glycol Dehydration Unit Emissions - Criteria and Hazardous Air Pollutants (Continued)

GRI-GLYCalc Results (Electric Pump) - For Reference Only

EPDEHY-1 - EPDEHY-3 (Each)

Controlled Regenerator Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	<0.0001	0.0001
n-Hexane	0.0027	0.0117
Benzene	0.0018	0.0080
Toluene	<0.0001	0.0002
Ethylbenzene	0.0000	0.0000
Xylenes	<0.0001	0.0001
Total HAPs =	**0.0046**	**0.0201**
Total VOC =	**0.1285**	**0.5626**

Uncontrolled Regenerator Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0075	0.0329
n-Hexane	0.6273	2.7474
Benzene	0.4639	2.0319
Toluene	0.0437	0.1913
Ethylbenzene	0.0000	0.0000
Xylenes	0.0837	0.3666
Total HAPs =	**1.2261**	**5.3701**
Total VOC =	**15.4590**	**67.7105**

Controlled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0001	0.0003
n-Hexane	0.0059	0.0257
Benzene	0.0001	0.0006
Toluene	<0.0001	<0.0001
Ethylbenzene	0.0000	0.0000
Xylenes	<0.0001	<0.0001
Total HAPs =	**0.0061**	**0.0266**
Total VOC =	**0.2708**	**1.1861**

Uncontrolled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0035	0.0151
n-Hexane	0.2936	1.2860
Benzene	0.0071	0.0313
Toluene	0.0004	0.0019
Ethylbenzene	0.0000	0.0000
Xylenes	0.0003	0.0014
Total HAPs =	**0.3049**	**1.3357**
Total VOC =	**13.5400**	**59.3052**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4a: Glycol Dehydration Unit Emissions - Criteria and Hazardous Air Pollutants (Continued)

GRI-GLYCalc Results (Gas Pumps) - For Reference Only

EPDEHY-1 - EPDEHY-3 (Each)

Controlled Regenerator Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	<0.0001	<0.0001
n-Hexane	0.0014	0.0061
Benzene	0.0014	0.0063
Toluene	<0.0001	0.0002
Ethylbenzene	0.0000	0.0000
Xylenes	<0.0001	0.0001
Total HAPs =	**0.0028**	**0.0127**
Total VOC =	**0.0691**	**0.3028**

Uncontrolled Regenerator Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0055	0.0241
n-Hexane	0.3811	1.6694
Benzene	0.4327	1.8954
Toluene	0.0419	0.1834
Ethylbenzene	0.0000	0.0000
Xylenes	0.0826	0.3617
Total HAPs =	**0.9438**	**4.1340**
Total VOC =	**11.6101**	**50.8521**

Controlled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0004	0.0016
n-Hexane	0.0255	0.1115
Benzene	0.0010	0.0042
Toluene	0.0001	0.0003
Ethylbenzene	0.0000	0.0000
Xylenes	<0.0001	0.0002
Total HAPs =	**0.0270**	**0.1178**
Total VOC =	**1.1072**	**4.8495**

Uncontrolled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
2, 2, 4-Trimethylpentane	0.0181	0.0793
n-Hexane	1.2733	5.5773
Benzene	0.0475	0.2082
Toluene	0.0029	0.0128
Ethylbenzene	0.0000	0.0000
Xylenes	0.0022	0.0097
Total HAPs =	**1.3440**	**5.8873**
Total VOC =	**55.3591**	**242.4730**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4b: Condenser Vent Stream Heat Content - Electric Pump - 55 mmscfd

Non-condensables (condenser vent stream) are routed to the reboiler for combustion and flash tank off-gas is used as fuel in the reboiler. Excess flash tank off-gases are recycled/recompressed. A control efficiency of 98% was used as a conservative measure. The heat content of the condenser vent stream has been calculated to determine total capacity required to combust the stream and demonstrate that each reboiler is adequately sized to burn these vapors from each respective dehydration unit.

Reboiler Capacity (mmBtu/hr) = 1.00 From GRI-GLYCalc Condenser Vent Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.39E+00	0
Carbon Dioxide	44.010	0.00	1.82E+00	0
Nitrogen	28.013	0.00	7.45E-02	0
Methane	16.042	919.00	1.42E+01	131
Ethane	30.069	1,619.00	2.72E+01	440
Propane	44.096	2,315.00	2.67E+01	618
Isobutane	58.122	3,000.00	4.48E+00	134
n-Butane	58.122	3,011.00	1.57E+01	473
Isopentane	72.149	3,699.00	2.36E+00	87
n-Pentane	72.149	3,707.00	3.36E+00	125
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	7.24E-01	34
Cyclohexane	84.161	4,481.50	3.01E-01	13
Other Hexanes (as n-Hexane)	86.175	4,756.00	8.97E-01	43
n-Heptane	100.204	5,502.50	8.44E-02	5
Methylcyclohexane	98.188	5,215.70	1.91E-01	10
Benzene	78.114	3,741.80	5.46E-01	20
Toluene	92.141	4,475.00	1.16E-02	1
Ethylbenzene	106.167	5,222.20	0.00E+00	0
Xylenes	106.500	5,208.87	5.11E-03	0
C8+ (as Nonane)	128.258	6,996.40	1.10E-02	1
		Total =	**1.00E+02**	**2,135**

GLYCalc Flow Rate =	8.12E+01	SCFH
Condenser Stream Heat Content =	0.17	mmBtu/hr
Adequate for Combustion of Non-Condensables?	YES	

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4c: Condenser Vent Stream Heat Content - Gas Pumps - 55 mmscfd

Non-condensables (condenser vent stream) are routed to the reboiler for combustion and flash tank off-gas is used as fuel in the reboiler. Excess flash tank off-gases are recycled/recompressed. A control efficiency of 98% was used as a conservative measure. The heat content of the condenser vent stream has been calculated to determine total capacity required to combust the stream and demonstrate that each reboiler is adequately sized to burn these vapors from each respective dehydration unit.

Reboiler Capacity (mmBtu/hr) = 1.00

From GRI-GLYCalc
Condenser Vent Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.39E+00	0
Carbon Dioxide	44.010	0.00	9.19E-01	0
Nitrogen	28.013	0.00	1.29E-01	0
Methane	16.042	919.00	2.82E+01	259
Ethane	30.069	1,619.00	2.57E+01	416
Propane	44.096	2,315.00	2.21E+01	512
Isobutane	58.122	3,000.00	3.52E+00	106
n-Butane	58.122	3,011.00	1.14E+01	343
Isopentane	72.149	3,699.00	1.81E+00	67
n-Pentane	72.149	3,707.00	2.45E+00	91
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	5.52E-01	26
Cyclohexane	84.161	4,481.50	2.59E-01	12
Other Hexanes (as n-Hexane)	86.175	4,756.00	6.69E-01	32
n-Heptane	100.204	5,502.50	7.84E-02	4
Methylcyclohexane	98.188	5,215.70	1.79E-01	9
Benzene	78.114	3,741.80	6.26E-01	23
Toluene	92.141	4,475.00	1.29E-02	1
Ethylbenzene	106.167	5,222.20	0.00E+00	0
Xylenes	106.500	5,208.87	5.86E-03	0
C8+ (as Nonane)	128.258	6,996.40	1.35E-02	1
		Total =	**1.00E+02**	**1,902**

GLYCalc Flow Rate = 5.57E+01 SCFH
Condenser Stream Heat Content = 0.11 mmBtu/hr
Adequate for Combustion of Non-Condensables? YES

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4d: Glycol Dehydration Unit Emissions - Greenhouse Gas Emissions

Input CH_4 mol% from gas analysis =	73.1340%
Input CO_2 mol% from gas analysis =	0.0960%

Potential Emissions

Greenhouse Gas (GHG) Emissions - Metric Tons (Tonnes)

Point ID: **EPDEHY-1 - EPDEHY-3 (Each)**

Pollutant	lb/hr	tonnes/yr
CO_2 =	0.01	0.03
CH_4 =	2.13	8.46
CH_4 as CO_2e =	53.22	211.45
Total CO_2 + CO_2e =	**53.22**	**211.48**

EPDEHY-1 - EPDEHY-3 (Total)

lb/hr	tonnes/yr
0.02	0.09
6.39	25.37
159.65	634.35
159.67	**634.44**

Greenhouse Gas (GHG) Emissions - Short Tons (Tons)

Point ID: **EPDEHY-1 - EPDEHY-3 (Each)**

Pollutant	lb/hr	tons/yr
CO_2 =	0.01	0.03
CH_4 =	2.13	9.32
CH_4 as CO_2e =	53.22	233.08
Total CO_2 + CO_2e =	**53.22**	**233.12**

EPDEHY-1 - EPDEHY-3 (Total)

lb/hr	tons/yr
0.02	0.10
6.39	27.97
159.65	699.25
159.67	**699.35**

Notes:
1) CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)
2) 40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO_2 = 1, CH_4 = 25, N_2O = 298
3) GRI-GLYCalc Input Summary and Aggregate Calculations Reports attached. 10% safety factor added to GRI-GLYCalc results to account for potential fluctuations in gas composition. Potential emissions for the electric pumps serve as the basis for the potential emissions since they are greater than potential emissions using the gas pumps.
4) Example CO_2 Calculation (Exhibit 5.1: API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry, August 2009):
tonnes CH_4 * tonne mole CH_4/16 tonne CH_4 * tonne mole gas/tonne mole CH_4 * tonne mole CO_2/tonne mole gas * 44 tonne CO_2/tonne mole CO_2 = tonnes CO_2/yr

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 4d: Glycol Dehydration Unit Emissions - Greenhouse Gas Emissions (Continued)

GRI-GLYCalc Results (Electric Pump) - For Reference Only

EPDEHY-1 - EPDEHY-3 (Each)

Controlled Regenerator Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	<0.0001	0.0002
CH_4 =	0.0097	0.0427
CH_4 as CO_2e =	0.2425	1.0675
Total CO_2 + CO_2e =	**0.2425**	**1.0677**

Uncontrolled Regenerator Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0018	0.0077
CH_4 =	0.4888	2.1409
CH_4 as CO_2e =	12.2200	53.5225
Total CO_2 + CO_2e =	**12.2218**	**53.5302**

Controlled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0007	0.0031
CH_4 =	0.1947	0.8529
CH_4 as CO_2e =	4.8675	21.3225
Total CO_2 + CO_2e =	**4.8682**	**21.3256**

Uncontrolled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0351	0.1539
CH_4 =	9.7362	42.6448
CH_4 as CO_2e =	243.4050	1,066.1200
Total CO_2 + CO_2e =	**243.4401**	**1,066.2739**

GRI-GLYCalc Results (Gas Pumps) - For Reference Only

EPDEHY-1 - EPDEHY-3 (Each)

Controlled Regenerator Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0000	0.0002
CH_4 =	0.0133	0.0583
CH_4 as CO_2e =	0.3325	1.4575
Total CO_2 + CO_2e =	**0.3325**	**1.4577**

Uncontrolled Regenerator Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0024	0.0106
CH_4 =	0.6682	2.9269
CH_4 as CO_2e =	16.7050	73.1725
Total CO_2 + CO_2e =	**16.7074**	**73.1831**

Controlled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.0069	0.0304
CH_4 =	1.9218	8.4175
CH_4 as CO_2e =	48.0450	210.4375
Total CO_2 + CO_2e =	**48.0519**	**210.4679**

Uncontrolled Flash Tank Emissions

Pollutant	lb/hr	tons/yr
CO_2 =	0.3469	1.5193
CH_4 =	96.0900	420.8744
CH_4 as CO_2e =	2,402.2500	10,521.8600
Total CO_2 + CO_2e =	**2,402.5969**	**10,523.3793**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 5a: Heater Emissions Calculations - Criteria Air Pollutants

Equipment Information

Point ID:	EPRBL-1	EPRBL-2	EPRBL-3	EPHT-1	EPHT-2
Description:	Glycol Reboiler	Glycol Reboiler	Glycol Reboiler	Heater Treater Burner	Heater Treater Burner
Burner Design (mmBtu/hr):	1.00	1.00	1.00	0.50	0.50
Fuel HHV (Btu/scf):	1,324	1,324	1,324	1,324	1,324
Annual Fuel Use (mmscf)	6.62	6.62	6.62	3.31	3.31
Annual Operating Hours:	8,760	8,760	8,760	8,760	8,760

Criteria Air Pollutant Emissions

Point ID:	EPRBL-1		EPRBL-2		EPRBL-3		EPHT-1		EPHT-2	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NOx	0.08	0.33	0.08	0.33	0.08	0.33	0.04	0.17	0.04	0.17
CO	0.06	0.28	0.06	0.28	0.06	0.28	0.03	0.14	0.03	0.14
VOC	<0.01	0.02	<0.01	0.02	<0.01	0.02	<0.01	0.01	<0.01	0.01
SO_2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
$PM_{10/2.5}$	<0.01	0.02	<0.01	0.02	<0.01	0.02	<0.01	0.01	<0.01	0.01
PM_{COND}	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
PM_{TOT}	0.01	0.03	0.01	0.03	0.01	0.03	<0.01	0.01	<0.01	0.01

AP-42 Emission Factors for Units <100 mmBtu/hr (lb/mmscf)

Pollutant	1.4-1, -2 (7/98)
NOx	100.0
CO	84.0
VOC	5.5
SO_2	0.6
$PM_{10/2.5}$	5.7
PM_{COND}	1.9
PM_{TOT}	7.6

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 5b: Heater Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPRBL-1	EPRBL-2	EPRBL-3	EPHT-1	EPHT-2
Description:	Glycol Reboiler	Glycol Reboiler	Glycol Reboiler	Heater Treater Burner	Heater Treater Burner
Burner Design (mmBtu/hr):	1.00	1.00	1.00	0.50	0.50
Fuel HHV (Btu/scf):	1,324	1,324	1,324	1,324	1,324
Annual Fuel Use (mmscf)	6.62	6.62	6.62	3.31	3.31
Annual Operating Hours:	8,760	8,760	8,760	8,760	8,760

Hazardous Air Pollutant Emissions

Point ID:	EPRBL-1		EPRBL-2		EPRBL-3		EPHT-1		EPHT-2	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
n-Hexane	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAPs	**<0.01**	**0.01**	**<0.01**	**0.01**	**<0.01**	**0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

AP-42 Emission Factors (lb/mmscf)

Pollutant	1.4-3 (7/98)
n-Hexane	1.80E+00
Formaldehyde	7.50E-02
Benzene	2.10E-03
Toluene	3.40E-03

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 5c: Heater Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPRBL-1	EPRBL-2	EPRBL-3	EPHT-1	EPHT-2
Description:	Glycol Reboiler	Glycol Reboiler	Glycol Reboiler	Heater Treater Burner	Heater Treater Burner
Burner Design (mmBtu/hr):	1.00	1.00	1.00	0.50	0.50
Fuel HHV (Btu/scf):	1,324	1,324	1,324	1,324	1,324
Annual Fuel Use (mmscf)	6.62	6.62	6.62	3.31	3.31
Annual Operating Hours:	8,760	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions - Metric Tons (Tonnes)

Point ID:	EPRBL-1		EPRBL-2		EPRBL-3		EPHT-1		EPHT-2	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2	116.98	464.80	116.98	464.80	116.98	464.80	58.49	232.40	58.49	232.40
CH_4	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
N_2O	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CH_4 as CO_2e	0.06	0.22	0.06	0.22	0.06	0.22	0.03	0.11	0.03	0.11
N_2O as CO_2e	0.07	0.26	0.07	0.26	0.07	0.26	0.03	0.13	0.03	0.13
Total CO_2 + CO_2e	**117.10**	**465.28**	**117.10**	**465.28**	**117.10**	**465.28**	**58.55**	**232.64**	**58.55**	**232.64**

Greenhouse Gas (GHG) Emissions - Short Tons (Tons)

Point ID:	EPRBL-1		EPRBL-2		EPRBL-3		EPHT-1		EPHT-2	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
CO_2	116.98	512.36	116.98	512.36	116.98	512.36	58.49	256.18	58.49	256.18
CH_4	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
N_2O	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CH_4 as CO_2e	0.06	0.24	0.06	0.24	0.06	0.24	0.03	0.12	0.03	0.12
N_2O as CO_2e	0.07	0.29	0.07	0.29	0.07	0.29	0.03	0.14	0.03	0.14
Total CO_2 + CO_2e	**117.10**	**512.89**	**117.10**	**512.89**	**117.10**	**512.89**	**58.55**	**256.44**	**58.55**	**256.44**

CO_2e = CO_2 equivalent (Pollutant times GWP multiplier). 40 CFR 98 Table A-1, Global Warming Potential (GWP) multiplier (100-Year Time Horizon): CO2 = 1, CH4 = 25, N2O = 298

40 CFR 98 Tables C-1 and C-2 Emission Factors (kg/mmBtu)

Carbon Dioxide (CO_2)	53.06
Methane (CH_4)	1.00E-03
Nitrous Oxide (N_2O)	1.00E-04

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 6a: Condensate Storage Tank Emissions - Criteria Air Pollutants

Tank Information

Point ID:	EPTK-1 - EPTK-8 (Each)	EPTK-1 - EPTK-8 (Total)
Number of Tanks:	8	-
Capacity (bbl):	400	-
Maximum Annual Throughput (bbl/yr):	7,500	60,000
Maximum Annual Throughput (gal/yr):	315,000	2,520,000
Average Daily Throughput (bbl/d):	20.55	164.38
Control Type:	VRU	VRU
Control Efficiency:	98%	98%

Uncontrolled Working, Breathing, and Flashing VOC Emissions

Point ID:	EPTK-1 - EPTK-8 (Each)		EPTK-1 - EPTK-8 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	3,156.71	1.58	25,253.68	12.63
Breathing	1,424.69	0.71	11,397.52	5.70
Flashing	36,498.24	18.25	291,985.91	145.99
Total =	**41,079.64**	**20.54**	**328,637.11**	**164.32**

Controlled Working, Breathing, and Flashing VOC Emissions

Point ID:	EPTK-1 - EPTK-8 (Each)		EPTK-1 - EPTK-8 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	63.13	0.03	505.07	0.25
Breathing	28.49	0.01	227.95	0.11
Flashing	729.96	0.36	5,839.72	2.92
Total =	**821.59**	**0.41**	**6,572.74**	**3.29**

1) There are eight (8) like-kind storage tanks used to store condensate. Each tank was modeled with an estimated 315,000 gal/yr throughput with a maximum of 2,520,000 gal/yr throughput for all eight (8) tanks. All tanks were modeled as Gasoline RVP 15 in EPA TANKS 4.0.9d for working and breathing losses. Flashing losses calculated with ProMax process simulation software.

2) Tanks are controlled by vapor recovery system, which is a closed system that is 100% efficient at preventing emissions from being vented to atmosphere except during vapor recovery system downtime (maintenance, utility power outage, etc.). Vapor recovery system downtime will not exceed 175 hours per year, or approximately 2% of the annual operating time, to ensure that a minimum overall control efficiency of 98% is achieved to control VOC emissions from the tanks. AMS will monitor and record vapor recovery system downtime to document compliance with this requirement.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 6b: Condensate Storage Tank Emissions - Hazardous Air Pollutants

Uncontrolled Hazardous Air Pollutant (HAP) Emissions (tons/yr)

EPTK-1 - EPTK-8 (Each)

Total VOC* =	**20.54**
n-Hexane	0.73
Benzene	0.01
Toluene	0.05
Ethylbenzene	0.05
Xylenes	0.19
Total HAPs =	**1.03**

EPTK-1 - EPTK-8 (Total)

Total VOC* =	**164.32**
n-Hexane	5.85
Benzene	0.08
Toluene	0.44
Ethylbenzene	0.39
Xylenes	1.48
Total HAPs =	**8.24**

Controlled Hazardous Air Pollutant (HAP) Emissions (tons/yr)

EPTK-1 - EPTK-8 (Each)

Total VOC* =	**0.41**
n-Hexane	0.01
Benzene	<0.01
Toluene	<0.01
Ethylbenzene	<0.01
Xylenes	<0.01
Total HAPs =	**0.02**

EPTK-1 - EPTK-8 (Total)

Total VOC* =	**3.29**
n-Hexane	0.12
Benzene	<0.01
Toluene	0.01
Ethylbenzene	0.01
Xylenes	0.03
Total HAPs =	**0.16**

*VOC emissions calculated in Condensate Storage Tank Emissions - Criteria Air Pollutants

HAP Composition (% by Weight)**

Pollutant	Wt%
n-Hexane	3.5605%
Benzene	0.0505%
Toluene	0.2670%
Ethylbenzene	0.2370%
Xylenes	0.9022%
Total HAPs =	**5.0172%**

**HAP Composition from Guy Avolio No. 8H Compositional Analysis of Separator Oil

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 6c: Condensate Flashing Emissions - Process Simulation

ProMax Results

Pollutant	530 bbl/day VOC tons/yr	164 bbl/day VOC tons/yr
Nitrogen	0.020985	0.01
Carbon Dioxide	0.51301	0.16
Methane	18.017	5.59
Ethane	95.476	29.61
Propane	150.04	46.54
i-Butane	31.716	9.84
n-Butane	104.31	32.35
i-Pentane	30.228	9.38
n-Pentane	49.701	15.41
n-Hexane	51.409	15.94
Heptane	35.257	10.93
Octane	13.249	4.11
Nonane	1.4888	0.46
Decane	0.90465	0.28
Benzene	0.27611	0.09
Toluene	1.0698	0.33
Ethylbenzene	0.28383	0.09
Xylenes	0.78263	0.24
Total VOC (C3+) =	**470.72**	**145.99**

Notes:
1) Simulation results reflect a total condensate and produced water throughput of approx. 530 bbl/day. Results prorated to requested production rate to allow for operational flexibility.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8a: Condensate Truck Loading Emissions Calculations - Criteria Air Pollutants

Loading Information

Point ID:	**EPLOAD-1**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
Em. Factor (lb/1000 gal)*:	4.88
Throughput (1000 gal):	2,520
Maximum Loading Rate (gal/hr):	15,120
Control Type:	Carbon Canister
Capture Efficiency:	70.00%
Captured Vapors Routed to:	Carbon Canister
Control Efficiency:	95.00%
Overall Control Efficiency [1]:	66.50%

*AP-42 5.2-4 Equation 1 (6/2008): Loading Loss (lb/1000 gal) = 12.46 *S*P*M/T, where:

7.0149	= P, True vapor pressure of liquid loaded (average psia)
47.52	= M, Molecular weight of vapor (lb/lb-mol) - Actual Analysis
50.33	= T, Temperature of bulk liquid loaded (average °F)
510.33	= T, Temperature of bulk liquid loaded (°F + 460 = °R)

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8a: Condensate Truck Loading Emissions Calculations - Criteria Air Pollutants (Continued)

Uncontrolled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	73.84	6.15

Uncaptured Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	22.15	1.85

Controlled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	2.58	0.22

Total Loading VOC Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	24.74	2.06

Notes:

1) Uncontrolled emissions that are captured by a collection system are routed to the carbon canister, which reduces emissions with 95% control efficiency. Per AP-42 5.2-6, 70% capture efficiency can be assumed for trucks not subject to NSPS. Uncaptured emissions shown represent those not captured by the collection system or controlled by the carbon canister. The overall reduction efficiency accounts for the capture efficiency of the collection system as well as the control efficiency of the carbon canister.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8b: Condensate Truck Loading Emissions Calculations - Hazardous Air Pollutants

Uncontrolled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**73.84**	**6.15**
n-Hexane	2.63	0.22
Benzene	0.04	<0.01
Toluene	0.20	0.02
Ethylbenzene	0.17	0.01
Xylenes	0.67	0.06
Total HAPs	**3.70**	**0.31**

Uncaptured Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**22.15**	**1.85**
n-Hexane	0.79	0.07
Benzene	0.01	<0.01
Toluene	0.06	<0.01
Ethylbenzene	0.05	<0.01
Xylenes	0.20	0.02
Total HAPs	**1.11**	**0.09**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8b: Condensate Truck Loading Emissions Calculations - Hazardous Air Pollutants (Continued)

Controlled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**2.58**	**0.22**
n-Hexane	0.09	0.01
Benzene	<0.01	<0.01
Toluene	0.01	<0.01
Ethylbenzene	0.01	<0.01
Xylenes	0.02	<0.01
Total HAPs	**0.13**	**0.01**

Total Loading HAP Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	**24.74**	**2.06**
n-Hexane	0.88	0.07
Benzene	0.01	<0.01
Toluene	0.07	0.01
Ethylbenzene	0.06	<0.01
Xylenes	0.22	0.02
Total HAPs	**1.24**	**0.10**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8b: Condensate Truck Loading Emissions Calculations - Hazardous Air Pollutants (Continued)

HAP Composition (% by Weight) [1]

Pollutant	Wt%
n-Hexane	3.5605%
Benzene	0.0505%
Toluene	0.2670%
Ethylbenzene	0.2370%
Xylenes	0.9022%
Total HAPs	**5.0172%**

Notes:
1) HAP Composition from Guy Avolio No. 8H Compositional Analysis of Separator Oil.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8c: Condensate Truck Loading Emissions Calculations - Greenhouse Gas Emissions

Loading Information

Point ID:	**EPLOAD-1**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
TOC Em. Factor (tonne/10^6 gal) *:	0.91
Throughput (10^6 gal):	2.520
Maximum Loading Rate (gal/hr):	15,120
Control Type:	Carbon Canister
Capture Efficiency:	70.00%
Captured Vapors Routed to:	Carbon Canister
Control Efficiency:	95.00%
Overall Control Efficiency [1]:	66.50%

Input CH_4 wt% from vapor analysis =	73.134%
Input CO_2 wt% from vapor analysis =	0.096%

Uncontrolled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	22.18	1.68
CH_4 as CO_2e	554.61	41.93
CO_2	0.03	<0.01
Total CO_2 + CO_2e	**554.64**	**41.93**

Uncontrolled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	22.18	1.85
CH_4 as CO_2e	554.61	46.22
CO_2	0.03	<0.01
Total CO_2 + CO_2e	**554.64**	**46.22**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8c: Condensate Truck Loading Emissions Calculations - Greenhouse Gas Emissions (Continued)

Uncaptured GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	6.66	0.50
CH_4 as CO_2e	166.38	12.58
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**166.39**	**12.58**

Uncaptured GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	6.66	0.55
CH_4 as CO_2e	166.38	13.87
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**166.39**	**13.87**

Controlled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	0.78	0.06
CH_4 as CO_2e	19.41	1.47
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**19.41**	**1.47**

Controlled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	0.78	0.06
CH_4 as CO_2e	19.41	1.62
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**19.41**	**1.62**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 8c: Condensate Truck Loading Emissions Calculations - Greenhouse Gas Emissions (Continued)

Total Loading GHG Emissions (Uncaptured + Controlled) - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	7.43	0.56
CH_4 as CO_2e	185.79	14.05
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**185.80**	**14.05**

Total Loading GHG Emissions (Uncaptured + Controlled) - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	7.43	0.62
CH_4 as CO_2e	185.79	15.48
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**185.80**	**15.48**

1) Uncontrolled emissions that are captured by a collection system are routed to the carbon canister, which reduces emissions with 95% control efficiency. Per AP-42 5.2-6, 70% capture efficiency can be assumed for trucks not subject to NSPS. Uncaptured emissions shown represent those not captured by the collection system or controlled by the carbon canister. The overall reduction efficiency accounts for the capture efficiency of the collection system as well as the control efficiency of the carbon canister.

2) CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 7a: Produced Water Storage Tank Emissions - Criteria Air Pollutants

Tank Information

Point ID:	EPWTK-1 - EPWTK-2 (Each)	EPWTK-1 - EPWTK-2 (Total)
Number of Tanks:	2	-
Capacity (bbl):	400	-
Max. Annual Prod. Water Throughput (bbl/yr):	18,250	36,500
Max. Annual Prod. Water Throughput (gal/yr):	766,500	1,533,000
Average Daily Prod. Water Throughput (bbl/d):	50	100
1% Throughput as Gasoline RVP 15 (gal/yr):	7,665	15,330
Control Type:	VRU	VRU
Control Efficiency:	98%	98%

Uncontrolled Working, Breathing, and Flashing VOC Emissions

Point ID:	EPWTK-1 - EPWTK-2 (Each)		EPWTK-1 - EPWTK-2 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	76.81	0.04	153.62	0.08
Breathing	1,424.69	0.71	2,849.38	1.42
Flashing	88,814.31	44.41	177,628.61	88.81
Total =	**90,315.81**	**45.16**	**180,631.61**	**90.32**

Controlled Working, Breathing, and Flashing VOC Emissions

Point ID:	EPWTK-1 - EPWTK-2 (Each)		EPWTK-1 - EPWTK-2 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	1.54	<0.01	3.07	<0.01
Breathing	28.49	0.01	56.99	0.03
Flashing	1,776.29	0.89	3,552.57	1.78
Total =	**1,806.32**	**0.90**	**3,612.63**	**1.81**

1) There are two (2) like-kind storage tanks that store produced water. Contents consist primarily of water with negligible hydrocarbons. For potential emissions, 1% of each tank throughput was modeled as Gasoline RVP 15 in EPA TANKS 4.0.9d for a conservative (higher) emissions estimate of working and breathing losses. Flashing losses calculated with ProMax process simulation software.

2) Tanks are controlled by vapor recovery, which is a closed system that is 100% efficient at preventing emissions from being vented to atmosphere except during vapor recovery system downtime (maintenance, utility power outage, etc.). Vapor recovery system downtime will not exceed 175 hours per year, or approx. 2% of annual operating time, to ensure that a minimum overall control efficiency of 98% is achieved. AMS will monitor and record vapor recovery system downtime to document compliance with this requirement.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 7b: Produced Water Storage Tank Emissions - Hazardous Air Pollutants

Uncontrolled Hazardous Air Pollutant (HAP) Emissions (tons/yr)

EPWTK-1 - EPWTK-2 (Each)

Total VOC* =	**45.16**
n-Hexane	1.61
Benzene	0.02
Toluene	0.12
Ethylbenzene	0.11
Xylenes	0.41
Total HAPs =	**2.27**

EPWTK-1 - EPWTK-2 (Total)

Total VOC* =	**90.32**
n-Hexane	3.22
Benzene	0.05
Toluene	0.24
Ethylbenzene	0.21
Xylenes	0.81
Total HAPs =	**4.53**

Controlled Hazardous Air Pollutant (HAP) Emissions (tons/yr)

EPWTK-1 - EPWTK-2 (Each)

Total VOC* =	**0.90**
n-Hexane	0.03
Benzene	<0.01
Toluene	<0.01
Ethylbenzene	<0.01
Xylenes	0.01
Total HAPs =	**0.05**

EPWTK-1 - EPWTK-2 (Total)

Total VOC* =	**1.81**
n-Hexane	0.06
Benzene	<0.01
Toluene	<0.01
Ethylbenzene	<0.01
Xylenes	0.02
Total HAPs =	**0.09**

*VOC emissions calculated in Produced Water Storage Tank Emissions - Criteria Air Pollutants

HAP Composition (% by Weight)**

Pollutant	Wt%
n-Hexane	3.5605%
Benzene	0.0505%
Toluene	0.2670%
Ethylbenzene	0.2370%
Xylenes	0.9022%
Total HAPs =	**5.0172%**

**HAP Composition from Guy Avolio No. 8H Compositional Analysis of Separator Oil

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 7c: Produced Water Flashing Emissions - Process Simulation

ProMax Results

Pollutant	530 bbl/day VOC tons/yr	100 bbl/day VOC tons/yr
Nitrogen	0.020985	<0.01
Carbon Dioxide	0.51301	0.10
Methane	18.017	3.40
Ethane	95.476	18.01
Propane	150.04	28.31
i-Butane	31.716	5.98
n-Butane	104.31	19.68
i-Pentane	30.228	5.70
n-Pentane	49.701	9.38
n-Hexane	51.409	9.70
Heptane	35.257	6.65
Octane	13.249	2.50
Nonane	1.4888	0.28
Decane	0.90465	0.17
Benzene	0.27611	0.05
Toluene	1.0698	0.20
Ethylbenzene	0.28383	0.05
Xylenes	0.78263	0.15
Total VOC (C3+) =	**470.72**	**88.81**

Notes:
1) Simulation results reflect a total condensate and produced water throughput of approx. 530 bbl/day. Results prorated to requested production rate to allow for operational flexibility.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9a: Produced Water Truck Loading Emissions Calculations - Criteria Air Pollutants

Loading Information

Point ID:	**EPLOAD-2**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
Em. Factor (lb/1000 gal)*:	4.88
Throughput (1000 gal):	15.33
Maximum Loading Rate (gal/hr):	15,120
Control Type:	Carbon Canister
Capture Efficiency:	70.00%
Captured Vapors Routed to:	Carbon Canister
Control Efficiency:	95.00%
Overall Control Efficiency [1]:	66.50%

*AP-42 5.2-4 Equation 1 (6/2008): Loading Loss (lb/1000 gal) = 12.46 *S*P*M/T, where:

7.0149	= P, True vapor pressure of liquid loaded (average psia)
47.52	= M, Molecular weight of vapor (lb/lb-mol) - Actual Analysis
50.33	= T, Temperature of bulk liquid loaded (average °F)
510.33	= T, Temperature of bulk liquid loaded (°F + 460 = °R)

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9a: Produced Water Truck Loading Emissions Calculations - Criteria Air Pollutants (Continued)

Uncontrolled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	73.84	0.04

Uncaptured Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	22.15	0.01

Controlled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	2.58	<0.01

Total Loading VOC Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	24.74	0.01

Notes:

1) Uncontrolled emissions that are captured by a collection system are routed to the carbon canister, which reduces emissions with 95% control efficiency. Per AP-42 5.2-6, 70% capture efficiency can be assumed for trucks not subject to NSPS. Uncaptured emissions shown represent those not captured by the collection system or controlled by the carbon canister. The overall reduction efficiency accounts for the capture efficiency of the collection system as well as the control efficiency of the carbon canister.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9b: Produced Water Truck Loading Emissions Calculations - Hazardous Air Pollutants

Uncontrolled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**73.84**	**0.04**
n-Hexane	2.63	<0.01
Benzene	0.04	<0.01
Toluene	0.20	<0.01
Ethylbenzene	0.17	<0.01
Xylenes	0.67	<0.01
Total HAPs	**3.70**	**<0.01**

Uncaptured Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**22.15**	**0.01**
n-Hexane	0.79	<0.01
Benzene	0.01	<0.01
Toluene	0.06	<0.01
Ethylbenzene	0.05	<0.01
Xylenes	0.20	<0.01
Total HAPs	**1.11**	**<0.01**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9b: Produced Water Truck Loading Emissions Calculations - Hazardous Air Pollutants (Continued)

Controlled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**2.58**	**<0.01**
n-Hexane	0.09	<0.01
Benzene	<0.01	<0.01
Toluene	0.01	<0.01
Ethylbenzene	0.01	<0.01
Xylenes	0.02	<0.01
Total HAPs	**0.13**	**<0.01**

Total Loading HAP Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	**24.74**	**0.01**
n-Hexane	0.88	<0.01
Benzene	0.01	<0.01
Toluene	0.07	<0.01
Ethylbenzene	0.06	<0.01
Xylenes	0.22	<0.01
Total HAPs	**1.24**	**<0.01**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9b: Produced Water Truck Loading Emissions Calculations - Hazardous Air Pollutants (Continued)

HAP Composition (% by Weight) [1]

Pollutant	Wt%
n-Hexane	3.5605%
Benzene	0.0505%
Toluene	0.2670%
Ethylbenzene	0.2370%
Xylenes	0.9022%
Total HAPs	**5.0172%**

Notes:

1) HAP Composition from Guy Avolio No. 8H Compositional Analysis of Separator Oil.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9c: Produced Water Truck Loading Emissions Calculations - Greenhouse Gas Emissions

Loading Information

Point ID:	**EPLOAD-2**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
TOC Em. Factor (tonne/10^6 gal) *:	0.91
Throughput (10^6 gal):	0.015
Maximum Loading Rate (gal/hr):	15,120
Control Type:	Carbon Canister
Capture Efficiency:	70.00%
Captured Vapors Routed to:	Carbon Canister
Control Efficiency:	95.00%
Overall Control Efficiency [1]:	66.50%

Input CH_4 wt% from vapor analysis =	73.134%
Input CO_2 wt% from vapor analysis =	0.096%

Uncontrolled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	22.18	0.01
CH_4 as CO_2e	554.61	0.26
CO_2	0.03	<0.01
Total CO_2 + CO_2e	**554.64**	**0.26**

Uncontrolled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	22.18	0.01
CH_4 as CO_2e	554.61	0.28
CO_2	0.03	<0.01
Total CO_2 + CO_2e	**554.64**	**0.28**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9c: Produced Water Truck Loading Emissions Calculations - Greenhouse Gas Emissions (Continued)

Uncaptured GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	6.66	<0.01
CH_4 as CO_2e	166.38	0.08
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**166.39**	**0.08**

Uncaptured GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	6.66	<0.01
CH_4 as CO_2e	166.38	0.08
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**166.39**	**0.08**

Controlled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	0.78	<0.01
CH_4 as CO_2e	19.41	0.01
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**19.41**	**0.01**

Controlled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	0.78	<0.01
CH_4 as CO_2e	19.41	0.01
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**19.41**	**0.01**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 9c: Produced Water Truck Loading Emissions Calculations - Greenhouse Gas Emissions (Continued)

Total Loading GHG Emissions (Uncaptured + Controlled) - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	7.43	<0.01
CH_4 as CO_2e	185.79	0.09
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**185.80**	**0.09**

Total Loading GHG Emissions (Uncaptured + Controlled) - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	7.43	<0.01
CH_4 as CO_2e	185.79	0.09
CO_2	0.01	<0.01
Total CO_2 + CO_2e	**185.80**	**0.09**

1) Uncontrolled emissions that are captured by a collection system are routed to the carbon canister, which reduces emissions with 95% control efficiency. Per AP-42 5.2-6, 70% capture efficiency can be assumed for trucks not subject to NSPS. Uncaptured emissions shown represent those not captured by the collection system or controlled by the carbon canister. The overall reduction efficiency accounts for the capture efficiency of the collection system as well as the control efficiency of the carbon canister.

2) CO_2e = CO_2 equivalent (Pollutant times GWP multiplier)

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 12: Fugitive Emissions Calculations

Equipment Information

Source Type/Service	Number of Sources	Em. Factor (lb/hr/source)	Control Efficiency	TOC lb/hr	TOC tons/yr	VOC Wt % *
Valves - Gas	931	9.92E-03	0.00%	9.2361	40.4542	23.1172%
Flanges - Gas	900	8.60E-04	0.00%	0.7738	3.3893	23.1172%
Compressor Seals - Gas	12	1.94E-02	0.00%	0.2328	1.0197	23.1172%
Relief Valves - Gas	26	1.94E-02	0.00%	0.5044	2.2093	23.1172%
Valves - Light Oil	30	5.51E-03	0.00%	0.1653	0.7242	79.0890%
Flanges - Light Oil	45	2.43E-04	0.00%	0.0109	0.0478	79.0890%
Pump Seals - Light Oil	4	2.87E-02	0.00%	0.1146	0.5021	79.0890%

* Total organic compound (TOC) emission rates multiplied by VOC content of the gas and liquid streams (weight percent) to obtain VOC emissions.

Emissions

Source Type/Service	VOC		CO_2		CH_4	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Valves - Gas	2.14	9.35	0.02	0.08	4.98	21.83
Flanges - Gas	0.18	0.78	<0.01	0.01	0.42	1.83
Compressor Seals - Gas	0.05	0.24	<0.01	<0.01	0.13	0.55
Relief Valves - Gas	0.12	0.51	<0.01	<0.01	0.27	1.19
Valves - Light Oil	0.13	0.57	<0.01	<0.01	0.02	0.07
Flanges - Light Oil	0.01	0.04	<0.01	<0.01	<0.01	<0.01
Pump Seals - Light Oil	0.09	0.40	<0.01	<0.01	0.01	0.05
Total =	**2.71**	**11.89**	**0.02**	**0.09**	**5.83**	**25.52**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 12: Fugitive Emissions Calculations (Continued)

Hazardous Air Pollutant (HAP) Emissions (lb/hr)

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	Total
Valves - Gas	0.04	<0.01	<0.01	<0.01	<0.01	0.04
Flanges - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Compressor Seals - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Relief Valves - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Valves - Light Oil	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Flanges - Light Oil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pump Seals - Light Oil	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Total =	**0.06**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.06**

Hazardous Air Pollutant (HAP) Emissions (tons/yr)

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	Total
Valves - Gas	0.19	<0.01	<0.01	<0.01	<0.01	0.19
Flanges - Gas	0.02	<0.01	<0.01	<0.01	<0.01	0.02
Compressor Seals - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Relief Valves - Gas	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Valves - Light Oil	0.03	<0.01	<0.01	<0.01	0.01	0.04
Flanges - Light Oil	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pump Seals - Light Oil	0.02	<0.01	<0.01	<0.01	<0.01	0.03
Total =	**0.26**	**<0.01**	**<0.01**	**<0.01**	**0.01**	**0.28**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 12: Fugitive Emissions Calculations (Continued)

Sand Hill Compositional Analysis of Separator Gas - 2/26/15

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	tons/yr
Hydrogen Sulfide	34.082	0.0000%	0.000	0.0000%	-	0.00	0.00
Carbon Dioxide	44.010	0.0960%	0.042	0.1931%	-	0.02	0.09
Nitrogen	28.013	0.3450%	0.097	0.4416%	-	0.05	0.21
Methane	16.042	73.1340%	11.732	53.6099%	53.952%	5.80	25.40
Ethane	30.069	16.5830%	4.986	22.7850%	22.931%	2.46	10.79
Propane	44.096	6.2040%	2.736	12.5008%	12.581%	1.35	5.92
i-Butane	58.122	0.6960%	0.405	1.8485%	1.860%	0.20	0.88
n-Butane	58.122	1.7500%	1.017	4.6478%	4.677%	0.50	2.20
i-Pentane	72.149	0.3540%	0.255	1.1671%	1.175%	0.13	0.55
n-Pentane	72.149	0.4420%	0.319	1.4572%	1.467%	0.16	0.69
n-Hexane	86.175	0.1154%	0.099	0.4544%	0.457%	0.05	0.22
Other Hexanes	86.175	0.1460%	0.126	0.5749%	0.579%	0.06	0.27
Heptanes (as n-Heptane)	100.202	0.0250%	0.025	0.1145%	0.115%	0.01	0.05
Benzene	78.114	0.0016%	0.001	0.0057%	0.006%	<0.01	<0.01
Toluene	92.141	0.0001%	0.000	0.0004%	0.000%	<0.01	<0.01
Ethylbenzene	106.167	0.0000%	0.000	0.0000%	0.000%	0.00	0.00
Xylenes	106.167	0.0001%	0.000	0.0005%	0.000%	<0.01	<0.01
Octanes (as n-Octane)	114.229	0.0347%	0.040	0.1811%	0.182%	0.02	0.09
Nonanes (as n-Nonane)	128.255	0.0030%	0.004	0.0176%	0.018%	<0.01	0.01
Decanes (as n-Decane)	142.282	0.0000%	0.000	0.0000%	0.000%	<0.01	<0.01
TOTAL =		**100.0000%**	**21.884**	**100.0000%**	**100.000%**	**10.82**	**47.37**
		TOTAL HC =	**21.745**	**TOTAL VOC =**	**23.117%**	**2.48**	**10.88**
				TOTAL HAP =	**0.464%**	**0.05**	**0.22**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 12: Fugitive Emissions Calculations (Continued)

Guy Avolio No. 8H Compositional Analysis of Separator Oil

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	TPY
Hydrogen Sulfide	34.082	0.0000%	0.000	0.0000%	-	0.00	0.00
Carbon Dioxide	44.010	0.0520%	0.023	0.0448%	-	<0.01	<0.01
Nitrogen	28.013	0.1050%	0.029	0.0575%	-	<0.01	<0.01
Methane	16.042	30.0520%	4.821	9.4304%	9.440%	0.03	0.12
Ethane	30.069	19.4820%	5.858	11.4592%	11.471%	0.03	0.15
Propane	44.096	14.3610%	6.333	12.3875%	12.400%	0.04	0.16
i-Butane	58.122	2.1200%	1.232	2.4103%	2.413%	0.01	0.03
n-Butane	58.122	7.2410%	4.209	8.2326%	8.241%	0.02	0.11
i-Pentane	72.149	2.0250%	1.461	2.8580%	2.861%	0.01	0.04
n-Pentane	72.149	3.3360%	2.407	4.7082%	4.713%	0.01	0.06
n-Hexane	86.175	2.1100%	1.818	3.5568%	3.560%	0.01	0.05
Other Hexanes	86.175	2.1870%	1.885	3.6866%	3.690%	0.01	0.05
Heptanes (as n-Heptane)	100.202	3.9050%	3.913	7.6542%	7.662%	0.02	0.10
Benzene	78.114	0.0330%	0.026	0.0504%	0.050%	<0.01	<0.01
Toluene	92.141	0.1480%	0.136	0.2668%	0.267%	<0.01	<0.01
Ethylbenzene	106.167	0.1140%	0.121	0.2368%	0.237%	<0.01	<0.01
Xylenes	106.167	0.4340%	0.461	0.9013%	0.902%	<0.01	0.01
Octanes (as n-Octane)	114.229	2.9780%	3.402	6.6543%	6.661%	0.02	0.08
Nonanes (as n-Nonane)	128.255	1.9110%	2.451	4.7944%	4.799%	0.01	0.06
Decanes (as n-Decane)	142.282	7.4050%	10.536	20.6099%	20.631%	0.06	0.26
TOTAL =		**99.9990%**	**51.121**	**100.00%**	**100.000%**	**0.29**	**1.28**
		TOTAL HC =	**51.069**	**TOTAL VOC =**	**79.089%**	**0.23**	**1.01**
				TOTAL HAP =	**5.017%**	**0.01**	**0.06**

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 13a: Blowdown Emissions Calculations

Estimated annual volume = 1,793,500 standard cubic feet per year (scf/yr)

* Based on an estimated 10 blowdowns per engine during the first month of operation and 8 blowdowns per engine per month for the remainder of the year. See following table for estimated engine blowdown volume calculations.

Speciated Gas Analysis and Emission Rates

Component	Molecular Weight lb/lb-mole	Vent Stream						
		Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	scf/yr	lb-mole/yr	tons/yr
Hydrogen Sulfide	34.082	0.0000%	0.000	0.000%	-	0	0	0.00
Carbon Dioxide	44.010	0.0960%	0.042	0.193%	-	1,722	5	0.10
Nitrogen	28.013	0.3450%	0.097	0.442%	-	6,188	16	0.23
Methane	16.042	73.1340%	11.732	53.610%	53.952%	1,311,659	3,457	27.73
Ethane	30.069	16.5830%	4.986	22.785%	22.931%	297,416	784	11.79
Propane	44.096	6.2040%	2.736	12.501%	12.581%	111,269	293	6.47
i-Butane	58.122	0.6960%	0.405	1.848%	1.860%	12,483	33	0.96
n-Butane	58.122	1.7500%	1.017	4.648%	4.677%	31,386	83	2.40
i-Pentane	72.149	0.3540%	0.255	1.167%	1.175%	6,349	17	0.60
n-Pentane	72.149	0.4420%	0.319	1.457%	1.467%	7,927	21	0.75
n-Hexane	86.175	0.1154%	0.099	0.454%	0.457%	2,070	5	0.24
Other Hexanes	86.175	0.1460%	0.126	0.575%	0.579%	2,619	7	0.30
Heptanes (as n-Heptane)	100.202	0.0250%	0.025	0.114%	0.115%	448	1	0.06
Benzene	78.114	0.0016%	0.001	0.006%	0.006%	29	0	<0.01
Toluene	92.141	0.0001%	0.000	0.000%	0.000%	2	0	<0.01
Ethylbenzene	106.167	0.0000%	0.000	0.000%	0.000%	0	0	0.00
Xylenes	106.167	0.0001%	0.000	0.000%	0.000%	2	0	<0.01
Octanes (as n-Octane)	114.229	0.0347%	0.040	0.181%	0.182%	622	2	0.09
Nonanes (as n-Nonane)	128.255	0.0030%	0.004	0.018%	0.018%	54	0	0.01
Decanes (as n-Decane)	142.282	0.0000%	0.000	0.000%	0.000%	0	0	0.00
TOTAL =		100.0000%	**21.884**	100.000%	100.000%	1,792,243	4,724	51.73
		TOTAL HC	**21.745**	**99.365%**	100.000%	1,784,334	4,703	51.40
					TOTAL VOC =	**23.117%**	**175,259**	**462**	**11.88**
					TOTAL HAPs =	**0.464%**	**2,102**	**6**	**0.24**

Molar volume conversion @ 60° F and 1 atm: 1 lb/mole = 379.4 scf

Note: Hourly emissions have not been estimated due to variances in operating conditions.

Appalachia Midstream Services, L.L.C.
Sand Hill Compressor Station
Table 13b: Blowdown Volume Calculations

Description	Amount Each	Length ft	ID in	Pa psig	Va ft^3	Vs ft^3	Weight of Gas (lb)
1st Suction Line	1	50	10.02	125	27	260	14.81
1st Suction Scrubber	1	6.5	30	125	32	303	17.26
1st Suction Bottle	1	7	20	125	15	145	8.26
1st Cylinder	2	4	13.625	125	8	77	4.38
1st Discharge Bottle	1	12	16	125	17	159	9.06
1st Discharge Line to Cooler	1	18.5	7.981	125	6	61	3.48
1st-2nd Inter-Cooler	118	24	0.505	125	4	37	2.13
2nd Suction Line from Cooler	1	35	7.981	125	12	116	6.58
2nd Suction Scrubber	1	5.5	24	125	17	164	9.35
2nd Suction Bottle	1	3	16	125	4	40	2.27
2nd Cylinder	1	4	10.5	125	2	23	1.30
2nd Discharge Bottle	1	3.83	16	125	5	51	2.89
2nd Discharge Line to Cooler	1	42.67	6.065	125	9	81	4.63
2nd-3rd Inter-Cooler	86	24	0.505	125	3	27	1.55
3rd Suction Line from Cooler	1	30.5	6.065	125	6	58	3.31
3rd Suction Scrubber	1	5.5	18	125	10	92	5.26
3rd Suction Bottle	1	3	14	125	3	30	1.73
3rd Cylinder	1	4	6.25	125	1	8	0.46
3rd Discharge Bottle	1	3.67	14	125	4	37	2.12
3rd Discharge Line to Cooler	1	29	3.826	125	2	22	1.25
After-Cooler	74	24	0.63	125	4	37	2.08
					TOTAL =	**1,830**	104.16

$P_s * V_s/T_s = P_a * V_z/T_a$

If $T_s = T_a$:

$V_s = P_a * V_a/P_s$

Pounds of Gas = V_s * Density of Air * SG

Specific Gravity (SG) = 0.76

Density of Air = 0.074887 lb/ft^3

P_s = 14.7 psig

a = Actual

ATTACHMENT O: MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

Except as noted on Emissions Unit Data Sheets, AMS is not submitting any special recommendations for monitoring, recordkeeping, reporting, or testing plans other than those typically established for the emissions units proposed in this application.

ATTACHMENT P: PUBLIC NOTICE

Note: Affidavit of Publication will be submitted upon receipt by AMS from the publisher.

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Appalachia Midstream Services, L.L.C. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a New Source Review (45 CSR 13) Modification permit for the Sand Hill Compressor Station located in Marshall County, West Virginia. Driving directions to the facility are: From Dallas, three (3) miles west on Stone Church Road, 1.3 miles south on Golden Road, then east into location.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx)	82.37 tons/yr
Carbon Monoxide (CO)	75.30 tons/yr
Volatile Organic Compounds (VOC)	94.46 tons/yr
Particulate Matter (PM)	6.84 tons/yr
Sulfur Dioxide (SO_2)	0.50 tons/yr
Acetaldehyde	5.45 tons/yr
Acrolein	3.35 tons/yr
Benzene	0.33 tons/yr
Ethylbenzene	0.05 tons/yr
Formaldehyde	3.22 tons/yr
Methanol	1.63 tons/yr
n-Hexane	1.89 tons/yr
Toluene	0.29 tons/yr
Xylenes	0.20 tons/yr
Methane	92.38 tons/yr
Carbon Dioxide	88,255.97 tons/yr
Nitrous Oxide	0.16 tons/yr
Carbon Dioxide Equivalent	90,611.53 tons/yr

Modifications are based on an updated gas analysis and no new construction is proposed. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the 31st of March 2016

By: Appalachia Midstream Services, L.L.C.
Don Wicburg
VP Northeast
P.O. Box 54382
Oklahoma City, OK 73154-1382

ATTACHMENT R: AUTHORITY OF CORPORATION

Note: The Authority Form designating Mr. Don Wicburg, VP Northeast, signatory authority by Mr. John Michael Stice, President and Chief Operating Officer of Williams, has already been submitted to the agency.

APPENDIX A: SUPPORT DOCUMENTS

CATERPILLAR G3516B AND OXIDATION CATALYST SPECIFICATION SHEETS

GRI-GLYCALC REPORTS

TANKS 4.0.9d REPORT

REPRESENTATIVE FUEL GAS ANALYSIS

REPRESENTATIVE GAS ANALYSIS

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	53.6
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	1203
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	77
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1380 bhp@1400rpm
SET POINT TIMING:	28		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	7420	7420	7947	8536
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	8167	8167	8747	9395
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	3148	3148	2469	1726
AIR FLOW	(WET)	(3)(4)	lb/hr	13958	13958	10949	7655
FUEL FLOW (60°F, 14.7 psia)			scfm	142	142	114	82
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	93.1	93.1	75.5	53.1
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	1012	1012	1005	1025
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	9240	9240	7226	5127
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	14449	14449	11343	7937
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.98	2.98	3.19	3.13
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	4.40	4.40	4.72	4.79
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	2.12	2.12	2.27	2.30
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	1.08	1.08	1.16	1.18
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.39	0.39	0.38	0.38
CO2		(8)(9)	g/bhp-hr	510	510	545	592
EXHAUST OXYGEN		(8)(11)	% DRY	9.1	9.1	8.8	8.4
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	22089	22089	20587	19228
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	4475	4475	3978	3363
HEAT REJ. TO A/C - STAGE 1 (1AC)		(12)(13)	Btu/min	9641	9641	7913	2550
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	5334	5334	5035	3317

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	39791
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5601
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

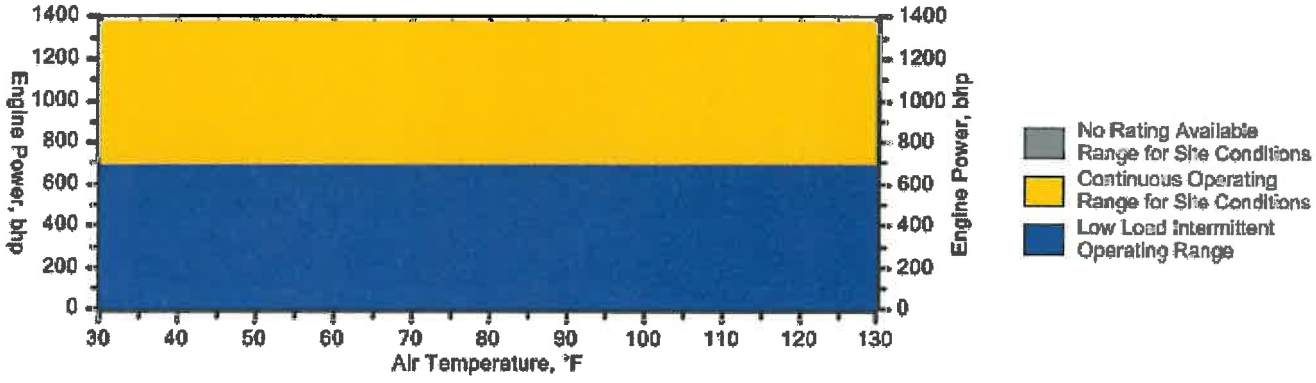
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 5.03.00
Ref. Data Set DM8800-07-001, Printed 26Jun2015

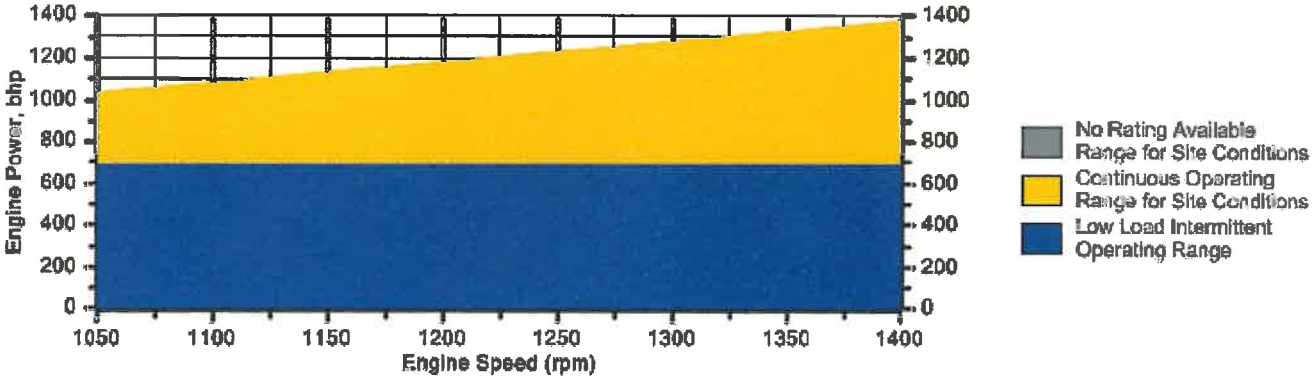
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



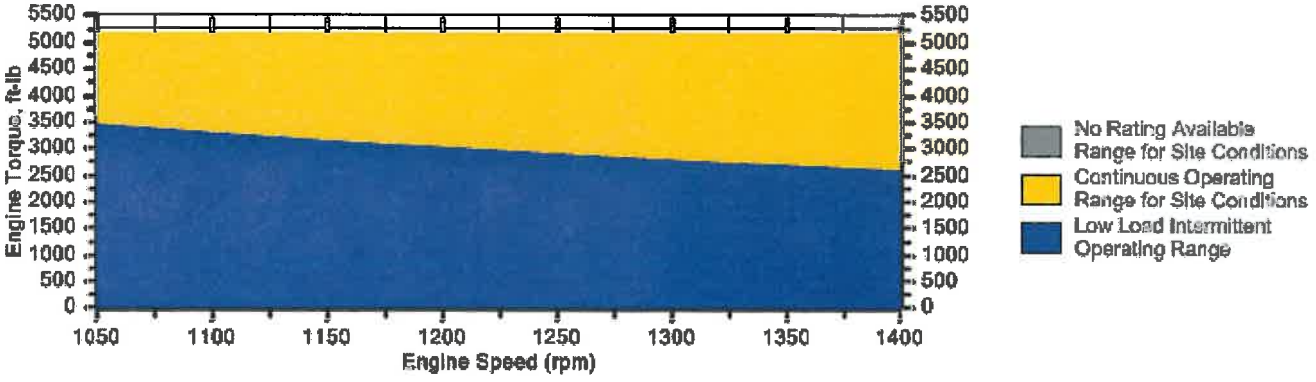
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 °F



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 3.0% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	73.1340	73.1340
Ethane	C2H6	16.5830	16.5830
Propane	C3H8	6.2040	6.2040
Isobutane	iso-C4H1O	0.6960	0.6960
Norbutane	nor-C4H1O	1.7500	1.7500
Isopentane	iso-C5H12	0.3540	0.3540
Norpentane	nor-C5H12	0.4420	0.4420
Hexane	C6H14	0.3960	0.3960
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.3450	0.3450
Carbon Dioxide	CO2	0.0960	0.0960
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Gas Analysis
Unit of Measure:	English
Calculated Fuel Properties	
Caterpillar Methane Number:	53.6
Lower Heating Value (Btu/scf):	1203
Higher Heating Value (Btu/scf):	1324
WOBBE Index (Btu/scf):	1382
THC: Free Inert Ratio:	225.76
Total % Inerts (% N2, CO2, He):	0.44%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.996
Stoich A/F Ratio (Vol/Vol):	12.45
Stoich A/F Ratio (Mass/Mass):	16.44
Specific Gravity (Relative to Air):	0.757
Specific Heat Constant (K):	1.273

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

2585 Heartland Drive
Sheridan, WY 82801
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kdunham@emittechnologies.com

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3516B
Horsepower:	1380
RPM:	1400
Compression Ratio:	8.0
Exhaust Flow Rate:	9240 CFM
Exhaust Temperature:	1012 °F
Reference:	DM8800-07-001
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

	g/bhp-hr
NOx:	0.50
CO:	2.98
THC:	4.40
NMHC	2.12
NMNEHC:	1.08
HCHO:	0.39
O2:	9.00 %

POST CATALYST EMISSIONS

	g/bhp-hr
NOx:	Unaffected by Oxidation Catalyst
CO:	<0.45
VOC:	<0.27
HCHO:	<0.02

CONTROL EQUIPMENT

Catalyst Housing

Model:	ELH-3550-1416F-4CE0-241
Manufacturer:	EMIT Technologies, Inc
Element Size:	Rectangle 24" x 15" x 3.5"
Housing Type:	4 Element Capacity
Catalyst Installation:	Accessible Housing
Construction:	10 gauge Carbon Steel
Sample Ports:	9 (0.5" NPT)
Inlet Connections:	14" Flat Face Flange
Outlet Connections:	16" Flat Face Flange
Configuration:	End In / Side Out
Silencer:	Integrated
Silencer Grade:	Hospital
Insertion Loss:	35-40 dBA

Catalyst Element

Model:	RT-2415-H
Catalyst Type:	Oxidation, Premium Precious Group Metals
Substrate Type:	BRAZED
Manufacturer:	EMIT Technologies, Inc
Element Quantity:	4
Element Size:	Rectangle 24" x 15" x 3.5"

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WARRANTY

EMIT Technologies, Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of two (2) years from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance using an EMIT Air/Fuel ratio controller is dependent upon properly defined set-points, variable with engine and fuel gas composition. Air/fuel ratio controller performance is guaranteed, but not limited, to fuel gas with a HHV content of 1400 BTU/SCF.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures. In most cases, excluding thermal deactivation, catalyst performance is redeemable by means of proper washing (refer to EMIT Catalyst/Silencer Housing Manual for element wash information, or contact a local EMIT Sales representative).

The exhaust temperature operating range at the converter inlet is a minimum of 600°F for oxidation catalyst and 750 °F for NSCR catalyst, and a maximum of 1250°F.

If a properly functioning, high temperature shut down switch is not installed, thermal deactivation of catalyst at sustained temperatures above 1250°F is not covered. If excessive exposure to over oxygenation of NSCR catalyst occurs due to improperly functioning or non-existent Air/Fuel ratio control, then deactivation of catalyst is not warranted.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent. Standard Oxidation Catalyst conversion efficiencies (% reduction) will be guaranteed for fuel gas containing less than 1.5% mole fraction of non-methane, non-ethane hydrocarbons. Applications where fuel gas exceeds this level will require a Premium Oxidation Catalyst to maintain guaranteed VOC conversion efficiencies.

Engine lubrication oil shall contain less than 0.5 wt% Sulfated Ash with a maximum allowable specific oil consumption of 0.7 g/bhp-hr. The catalyst shall be limited to a maximum ash loading of 0.022 lb/ft3. Phosphorous and zinc additives are limited to 0.03 wt%. New or Reconstructed engines must operate for a minimum of 50 hours prior to catalyst installation, otherwise the warranty is void.

The catalyst must not be exposed to the following know poisoning agents, including: antimony, arsenic, chromium, copper, iron, lead, lithium, magnesium, mercury, nickel, phosphorous, potassium, silicon, sodium, sulfur, tin, and zinc. Total poison concentrations in the fuel gas must be limited to 0.25 ppm or less for catalyst to function properly.

Shipment - Promised shipping dates are approximate lead times from the point of manufacture and are not guaranteed. EMIT Technologies, Inc. will not be liable for any loss, damage or delay in manufacture or delivery resulting from any cause beyond its control including, but not limited to a period equal to the time lost by reason of that delay. All products will be crated as per best practice to prevent any damage during shipment. Unless otherwise specified, Buyer will pay for any special packing and shipping requirements. Acceptance of goods by common carrier constitutes delivery to Buyer. EMIT Technologies, Inc. shall not be responsible for goods damaged or lost in transit.

Terms: Credit is extended to purchaser for net 30 time period. If payment is not received in the net 30 timeframe, interest on the unpaid balance will accrue at a rate of 1.5% per month from the invoice date.

Order Cancellation Terms: Upon cancellation of an order once submittal of a Purchase Order has occurred, the customer will pay a 25% restocking fee for Catalyst Housings, Catalyst Elements, and Air/Fuel Ratio Controllers; 50% restocking fee for Cooler Top Solutions Exhaust System Accessories, and other Custom Built Products; 100% of all associated shipping costs incurred by EMIT; 100% of all project expenses incurred by EMIT for Field Services.

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Sand Hill Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Electric - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

DESCRIPTION:

Description: Three identical dehydration units
Sand Hill Gas Analysis 2/26/15
55 MMSCFD/7.5 gpm
Still vent condenser/combustion; flash tank
combustion 98% - excess
recycled/recompressed

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 103.00 deg. F
Pressure: 950.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.0960
Nitrogen	0.3450
Methane	73.1340
Ethane	16.5830
Propane	6.2040
Isobutane	0.6960
n-Butane	1.7500
Isopentane	0.3540
n-Pentane	0.4420
n-Hexane	0.1154
Cyclohexane	0.0110
Other Hexanes	0.1460
Heptanes	0.0250
Methylcyclohexane	0.0134
2,2,4-Trimethylpentane	0.0015
Benzene	0.0016
Toluene	0.0001
Xylenes	0.0001
C8+ Heavies	0.0819

DRY GAS:

Flow Rate: 55.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 7.5 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Temperature:	120.0 deg. F
Pressure:	50.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device:	Condenser
Temperature:	52.0 deg. F
Pressure:	14.1 psia
Control Device:	Combustion Device
Destruction Efficiency:	98.0 %
Excess Oxygen:	0.0 %
Ambient Air Temperature:	52.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Sand Hill Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Electric - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

DESCRIPTION:

Description: Three identical dehydration units
Sand Hill Gas Analysis 2/26/15
55 MMSCFD/7.5 gpm
Still vent condenser/combustion; flash tank
combustion 98% - excess
recycled/recompressed

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0097	0.234	0.0427
Ethane	0.0350	0.840	0.1532
Propane	0.0504	1.209	0.2206
Isobutane	0.0112	0.268	0.0489
n-Butane	0.0391	0.938	0.1712
Isopentane	0.0073	0.175	0.0319
n-Pentane	0.0104	0.249	0.0454
n-Hexane	0.0027	0.064	0.0117
Cyclohexane	0.0011	0.026	0.0047
Other Hexanes	0.0033	0.079	0.0145
Heptanes	0.0004	0.009	0.0016
Methylcyclohexane	0.0008	0.019	0.0035
2,2,4-Trimethylpentane	<0.0001	<0.001	0.0001
Benzene	0.0018	0.044	0.0080
Toluene	<0.0001	0.001	0.0002
Xylenes	<0.0001	0.001	0.0001
C8+ Heavies	0.0001	0.001	0.0003
Total Emissions	0.1732	4.156	0.7585
Total Hydrocarbon Emissions	0.1732	4.156	0.7585
Total VOC Emissions	0.1285	3.083	0.5626
Total HAP Emissions	0.0046	0.110	0.0200
Total BTEX Emissions	0.0019	0.045	0.0083

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.4888	11.731	2.1409
Ethane	1.7762	42.630	7.7799
Propane	2.7291	65.497	11.9532
Isobutane	0.6677	16.025	2.9245
n-Butane	2.5481	61.155	11.1608

Isopentane	0.6308	15.140	2.7630
n-Pentane	1.1159	26.781	4.8876
n-Hexane	0.6273	15.054	2.7474
Cyclohexane	0.3483	8.360	1.5257
Other Hexanes	0.5642	13.541	2.4712
Heptanes	0.3090	7.416	1.3533
Methylcyclohexane	0.5038	12.091	2.2066
2,2,4-Trimethylpentane	0.0075	0.180	0.0329
Benzene	0.4639	11.134	2.0319
Toluene	0.0437	1.048	0.1913
Xylenes	0.0837	2.009	0.3666
C8+ Heavies	4.8161	115.585	21.0943
Total Emissions	17.7240	425.377	77.6312
Total Hydrocarbon Emissions	17.7240	425.377	77.6312
Total VOC Emissions	15.4590	371.016	67.7105
Total HAP Emissions	1.2260	29.425	5.3701
Total BTEX Emissions	0.5913	14.191	2.5898

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1947	4.673	0.8529
Ethane	0.2028	4.867	0.8883
Propane	0.1354	3.250	0.5931
Isobutane	0.0218	0.522	0.0953
n-Butane	0.0628	1.508	0.2752
Isopentane	0.0135	0.325	0.0592
n-Pentane	0.0190	0.455	0.0830
n-Hexane	0.0059	0.141	0.0257
Cyclohexane	0.0008	0.020	0.0037
Other Hexanes	0.0070	0.169	0.0308
Heptanes	0.0014	0.034	0.0062
Methylcyclohexane	0.0009	0.023	0.0041
2,2,4-Trimethylpentane	0.0001	0.002	0.0003
Benzene	0.0001	0.003	0.0006
Toluene	<0.0001	<0.001	<0.0001
Xylenes	<0.0001	<0.001	<0.0001
C8+ Heavies	0.0020	0.048	0.0088
Total Emissions	0.6683	16.040	2.9273
Total Hydrocarbon Emissions	0.6683	16.040	2.9273
Total VOC Emissions	0.2708	6.499	1.1861 ✓ @98%
Total HAP Emissions	0.0061	0.146	0.0267
Total BTEX Emissions	0.0002	0.004	0.0007

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	9.7362	233.670	42.6448
Ethane	10.1403	243.366	44.4143
Propane	6.7701	162.482	29.6529
Isobutane	1.0882	26.116	4.7661
n-Butane	3.1413	75.392	13.7591
Isopentane	0.6763	16.231	2.9622
n-Pentane	0.9479	22.749	4.1517

n-Hexane	0.2936	7.047	1.2860
Cyclohexane	0.0423	1.014	0.1851
Other Hexanes	0.3512	8.428	1.5381
Heptanes	0.0703	1.687	0.3079
Methylcyclohexane	0.0470	1.128	0.2059
2,2,4-Trimethylpentane	0.0035	0.083	0.0151
Benzene	0.0071	0.172	0.0313
Toluene	0.0004	0.010	0.0019
Xylenes	0.0003	0.008	0.0014
C8+ Heavies	0.1005	2.413	0.4404
Total Emissions	33.4165	801.996	146.3642
Total Hydrocarbon Emissions	33.4165	801.996	146.3642
Total VOC Emissions	13.5400	324.960	59.3052
Total HAP Emissions	0.3050	7.319	1.3358
Total BTEX Emissions	0.0079	0.190	0.0346

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	52.00 deg. F
Condenser Pressure:	14.08 psia
Condenser Duty:	3.69e-002 MM BTU/hr
Hydrocarbon Recovery:	0.73 bbls/day
Produced Water:	9.67 bbls/day
Ambient Temperature:	52.00 deg. F
Excess Oxygen:	0.00 %
Combustion Efficiency:	98.00 %
Supplemental Fuel Requirement:	3.69e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	1.99%	98.01%
Ethane	1.97%	98.03%
Propane	1.85%	98.15%
Isobutane	1.67%	98.33%
n-Butane	1.53%	98.47%
Isopentane	1.16%	98.84%
n-Pentane	0.93%	99.07%
n-Hexane	0.43%	99.57%
Cyclohexane	0.31%	99.69%
Other Hexanes	0.59%	99.41%
Heptanes	0.12%	99.88%
Methylcyclohexane	0.16%	99.84%
2,2,4-Trimethylpentane	0.16%	99.84%
Benzene	0.39%	99.61%
Toluene	0.10%	99.90%
Xylenes	0.03%	99.97%
C8+ Heavies	0.00%	100.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	4.71 lbs. H2O/MMSCF
Temperature:	103.0 deg. F
Pressure:	950.0 psig
Dry Gas Flow Rate:	55.0000 MMSCF/day
Glycol Losses with Dry Gas:	1.7094 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	66.20 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	3.19 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.11%	92.89%
Carbon Dioxide	99.82%	0.18%
Nitrogen	99.98%	0.02%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.94%	0.06%
Isobutane	99.93%	0.07%
n-Butane	99.91%	0.09%
Isopentane	99.92%	0.08%
n-Pentane	99.89%	0.11%
n-Hexane	99.85%	0.15%
Cyclohexane	99.30%	0.70%
Other Hexanes	99.88%	0.12%
Heptanes	99.75%	0.25%
Methylcyclohexane	99.31%	0.69%
2,2,4-Trimethylpentane	99.89%	0.11%
Benzene	93.76%	6.24%
Toluene	92.07%	7.93%
Xylenes	86.89%	13.11%
C8+ Heavies	99.42%	0.58%

FLASH TANK

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Flash Temperature:	120.0 deg. F
Flash Pressure:	50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	38.91%	61.09%
Nitrogen	4.53%	95.47%
Methane	4.78%	95.22%
Ethane	14.91%	85.09%
Propane	28.73%	71.27%
Isobutane	38.03%	61.97%
n-Butane	44.79%	55.21%
Isopentane	48.52%	51.48%
n-Pentane	54.30%	45.70%
n-Hexane	68.27%	31.73%
Cyclohexane	89.53%	10.47%
Other Hexanes	62.02%	37.98%

Heptanes	81.56%	18.44%
Methylcyclohexane	91.81%	8.19%
2,2,4-Trimethylpentane	68.94%	31.06%
Benzene	98.56%	1.44%
Toluene	99.10%	0.90%
Xylenes	99.67%	0.33%
C8+ Heavies	98.20%	1.80%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	30.98%	69.02%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.03%	98.97%
n-Pentane	0.92%	99.08%
n-Hexane	0.73%	99.27%
Cyclohexane	3.57%	96.43%
Other Hexanes	1.61%	98.39%
Heptanes	0.61%	99.39%
Methylcyclohexane	4.36%	95.64%
2,2,4-Trimethylpentane	2.18%	97.82%
Benzene	5.07%	94.93%
Toluene	7.98%	92.02%
Xylenes	12.99%	87.01%
C8+ Heavies	12.27%	87.73%

STREAM REPORTS:

WET GAS STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.30e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e-001	1.52e+002
Carbon Dioxide	9.59e-002	2.55e+002
Nitrogen	3.45e-001	5.84e+002
Methane	7.30e+001	7.09e+004
Ethane	1.66e+001	3.01e+004
Propane	6.20e+000	1.65e+004
Isobutane	6.95e-001	2.44e+003
n-Butane	1.75e+000	6.14e+003
Isopentane	3.54e-001	1.54e+003

n-Pentane	4.41e-001	1.93e+003
n-Hexane	1.15e-001	6.01e+002
Cyclohexane	1.10e-002	5.59e+001
Other Hexanes	1.46e-001	7.60e+002
Heptanes	2.50e-002	1.51e+002
Methylcyclohexane	1.34e-002	7.95e+001
2,2,4-Trimethylpentane	1.50e-003	1.04e+001
Benzene	1.60e-003	7.55e+000
Toluene	9.99e-005	5.57e-001
Xylenes	9.99e-005	6.41e-001
C8+ Heavies	8.18e-002	8.43e+002
Total Components	100.00	1.33e+005

DRY GAS STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.29e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.93e-003	1.08e+001
Carbon Dioxide	9.58e-002	2.55e+002
Nitrogen	3.45e-001	5.84e+002
Methane	7.31e+001	7.09e+004
Ethane	1.66e+001	3.01e+004
Propane	6.20e+000	1.65e+004
Isobutane	6.96e-001	2.44e+003
n-Butane	1.75e+000	6.14e+003
Isopentane	3.54e-001	1.54e+003
n-Pentane	4.42e-001	1.92e+003
n-Hexane	1.15e-001	6.00e+002
Cyclohexane	1.09e-002	5.55e+001
Other Hexanes	1.46e-001	7.59e+002
Heptanes	2.49e-002	1.51e+002
Methylcyclohexane	1.33e-002	7.89e+001
2,2,4-Trimethylpentane	1.50e-003	1.03e+001
Benzene	1.50e-003	7.08e+000
Toluene	9.21e-005	5.13e-001
Xylenes	8.69e-005	5.57e-001
C8+ Heavies	8.14e-002	8.38e+002
Total Components	100.00	1.33e+005

LEAN GLYCOL STREAM

Temperature: 103.00 deg. F
Flow Rate: 7.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	4.16e+003
Water	1.50e+000	6.33e+001
Carbon Dioxide	1.08e-012	4.58e-011
Nitrogen	2.34e-013	9.89e-012
Methane	8.14e-018	3.44e-016
Ethane	1.33e-007	5.62e-006

Propane	9.16e-009	3.87e-007
Isobutane	1.25e-009	5.27e-008
n-Butane	3.34e-009	1.41e-007
Isopentane	1.56e-004	6.57e-003
n-Pentane	2.46e-004	1.04e-002
n-Hexane	1.10e-004	4.63e-003
Cyclohexane	3.06e-004	1.29e-002
Other Hexanes	2.19e-004	9.25e-003
Heptanes	4.51e-005	1.91e-003
Methylcyclohexane	5.44e-004	2.30e-002
2,2,4-Trimethylpentane	3.95e-006	1.67e-004
Benzene	5.87e-004	2.48e-002
Toluene	8.97e-005	3.79e-003
Xylenes	2.96e-004	1.25e-002
C8+ Heavies	1.60e-002	6.73e-001
Total Components	100.00	4.22e+003

RICH GLYCOL STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 7.89e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.42e+001	4.16e+003
Water	4.63e+000	2.04e+002
Carbon Dioxide	1.04e-002	4.58e-001
Nitrogen	2.24e-003	9.87e-002
Methane	2.32e-001	1.02e+001
Ethane	2.70e-001	1.19e+001
Propane	2.15e-001	9.50e+000
Isobutane	3.98e-002	1.76e+000
n-Butane	1.29e-001	5.69e+000
Isopentane	2.98e-002	1.31e+000
n-Pentane	4.70e-002	2.07e+000
n-Hexane	2.10e-002	9.26e-001
Cyclohexane	9.14e-003	4.04e-001
Other Hexanes	2.10e-002	9.25e-001
Heptanes	8.64e-003	3.81e-001
Methylcyclohexane	1.30e-002	5.74e-001
2,2,4-Trimethylpentane	2.52e-004	1.11e-002
Benzene	1.12e-002	4.96e-001
Toluene	1.09e-003	4.79e-002
Xylenes	2.19e-003	9.65e-002
C8+ Heavies	1.27e-001	5.59e+000
Total Components	100.00	4.41e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 64.70 psia
Flow Rate: 4.61e+002 scfh

Component	Conc.	Loading

	(vol%)	(lb/hr)
Water	2.95e-001	6.46e-002
Carbon Dioxide	5.22e-001	2.80e-001
Nitrogen	2.77e-001	9.42e-002
Methane	4.99e+001	9.74e+000
Ethane	2.77e+001	1.01e+001
Propane	1.26e+001	6.77e+000
Isobutane	1.54e+000	1.09e+000
n-Butane	4.44e+000	3.14e+000
Isopentane	7.71e-001	6.76e-001
n-Pentane	1.08e+000	9.48e-001
n-Hexane	2.80e-001	2.94e-001
Cyclohexane	4.13e-002	4.23e-002
Other Hexanes	3.35e-001	3.51e-001
Heptanes	5.77e-002	7.03e-002
Methylcyclohexane	3.94e-002	4.70e-002
2,2,4-Trimethylpentane	2.49e-003	3.46e-003
Benzene	7.53e-003	7.15e-003
Toluene	3.84e-004	4.31e-004
Xylenes	2.46e-004	3.18e-004
C8+ Heavies	4.85e-002	1.01e-001
Total Components	100.00	3.39e+001

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 7.81e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.49e+001	4.16e+003
Water	4.67e+000	2.04e+002
Carbon Dioxide	4.07e-003	1.78e-001
Nitrogen	1.02e-004	4.47e-003
Methane	1.12e-002	4.89e-001
Ethane	4.06e-002	1.78e+000
Propane	6.23e-002	2.73e+000
Isobutane	1.52e-002	6.68e-001
n-Butane	5.82e-002	2.55e+000
Isopentane	1.46e-002	6.37e-001
n-Pentane	2.57e-002	1.13e+000
n-Hexane	1.44e-002	6.32e-001
Cyclohexane	8.25e-003	3.61e-001
Other Hexanes	1.31e-002	5.73e-001
Heptanes	7.10e-003	3.11e-001
Methylcyclohexane	1.20e-002	5.27e-001
2,2,4-Trimethylpentane	1.75e-004	7.67e-003
Benzene	1.12e-002	4.89e-001
Toluene	1.08e-003	4.75e-002
Xylenes	2.20e-003	9.62e-002
C8+ Heavies	1.25e-001	5.49e+000
Total Components	100.00	4.38e+003

FLASH GAS EMISSIONS

Flow Rate: 2.10e+003 scfh
Control Method: Combustion Device
Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.03e+001	6.03e+001
Carbon Dioxide	3.92e+001	9.56e+001
Nitrogen	6.06e-002	9.42e-002
Methane	2.19e-001	1.95e-001
Ethane	1.22e-001	2.03e-001
Propane	5.54e-002	1.35e-001
Isobutane	6.75e-003	2.18e-002
n-Butane	1.95e-002	6.28e-002
Isopentane	3.38e-003	1.35e-002
n-Pentane	4.74e-003	1.90e-002
n-Hexane	1.23e-003	5.87e-003
Cyclohexane	1.81e-004	8.45e-004
Other Hexanes	1.47e-003	7.02e-003
Heptanes	2.53e-004	1.41e-003
Methylcyclohexane	1.73e-004	9.40e-004
2,2,4-Trimethylpentane	1.09e-005	6.91e-005
Benzene	3.30e-005	1.43e-004
Toluene	1.68e-006	8.61e-006
Xylenes	1.08e-006	6.37e-006
C8+ Heavies	2.13e-004	2.01e-003
Total Components	100.00	1.57e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.09e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.63e+001	1.41e+002
Carbon Dioxide	4.98e-002	1.78e-001
Nitrogen	1.96e-003	4.47e-003
Methane	3.75e-001	4.89e-001
Ethane	7.26e-001	1.78e+000
Propane	7.61e-001	2.73e+000
Isobutane	1.41e-001	6.68e-001
n-Butane	5.39e-001	2.55e+000
Isopentane	1.08e-001	6.31e-001
n-Pentane	1.90e-001	1.12e+000
n-Hexane	8.95e-002	6.27e-001
Cyclohexane	5.09e-002	3.48e-001
Other Hexanes	8.05e-002	5.64e-001
Heptanes	3.79e-002	3.09e-001
Methylcyclohexane	6.31e-002	5.04e-001
2,2,4-Trimethylpentane	8.08e-004	7.50e-003
Benzene	7.30e-002	4.64e-001
Toluene	5.83e-003	4.37e-002
Xylenes	9.70e-003	8.37e-002
C8+ Heavies	3.48e-001	4.82e+000
Total Components	100.00	1.59e+002

CONDENSER PRODUCED WATER STREAM

Temperature: 52.00 deg. F
Flow Rate: 2.82e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.41e+002	999774.
Carbon Dioxide	3.93e-003	5.55e-003	39.
Nitrogen	1.67e-006	2.35e-006	0.
Methane	4.14e-004	5.85e-004	4.
Ethane	2.22e-003	3.14e-003	22.
Propane	1.47e-003	2.08e-003	15.
Isobutane	1.94e-004	2.74e-004	2.
n-Butane	9.88e-004	1.39e-003	10.
Isopentane	1.45e-004	2.04e-004	1.
n-Pentane	2.34e-004	3.31e-004	2.
n-Hexane	5.83e-005	8.23e-005	1.
Cyclohexane	1.72e-004	2.43e-004	2.
Other Hexanes	5.45e-005	7.69e-005	1.
Heptanes	4.85e-006	6.84e-006	0.
Methylcyclohexane	6.51e-005	9.19e-005	1.
2,2,4-Trimethylpentane	1.03e-007	1.46e-007	0.
Benzene	1.22e-002	1.72e-002	122.
Toluene	2.86e-004	4.04e-004	3.
Xylenes	1.88e-004	2.66e-004	2.
C8+ Heavies	1.44e-007	2.03e-007	0.
Total Components	100.00	1.41e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 52.00 deg. F
Flow Rate: 2.13e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	1.43e-002	1.29e-003
Carbon Dioxide	1.02e-002	9.19e-004
Nitrogen	2.75e-005	2.48e-006
Methane	1.18e-002	1.06e-003
Ethane	2.66e-001	2.41e-002
Propane	2.31e+000	2.09e-001
Isobutane	1.21e+000	1.09e-001
n-Butane	6.55e+000	5.92e-001
Isopentane	2.95e+000	2.66e-001
n-Pentane	6.60e+000	5.97e-001
n-Hexane	5.46e+000	4.94e-001
Cyclohexane	3.25e+000	2.94e-001
Other Hexanes	4.41e+000	3.99e-001
Heptanes	3.22e+000	2.91e-001
Methylcyclohexane	5.13e+000	4.64e-001
2,2,4-Trimethylpentane	7.62e-002	6.89e-003
Benzene	3.93e+000	3.55e-001
Toluene	4.53e-001	4.10e-002
Xylenes	9.10e-001	8.23e-002
C8+ Heavies	5.32e+001	4.81e+000

Total Components	100.00	9.04e+000

CONDENSER VENT STREAM

Temperature: 52.00 deg. F
Pressure: 14.08 psia
Flow Rate: 8.12e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e+000	5.35e-002
Carbon Dioxide	1.82e+000	1.72e-001
Nitrogen	7.45e-002	4.47e-003
Methane	1.42e+001	4.87e-001
Ethane	2.72e+001	1.75e+000
Propane	2.67e+001	2.52e+000
Isobutane	4.48e+000	5.58e-001
n-Butane	1.57e+001	1.95e+000
Isopentane	2.36e+000	3.64e-001
n-Pentane	3.36e+000	5.19e-001
n-Hexane	7.24e-001	1.34e-001
Cyclohexane	3.01e-001	5.42e-002
Other Hexanes	8.97e-001	1.65e-001
Heptanes	8.44e-002	1.81e-002
Methylcyclohexane	1.91e-001	4.01e-002
2,2,4-Trimethylpentane	2.51e-003	6.14e-004
Benzene	5.46e-001	9.13e-002
Toluene	1.16e-002	2.29e-003
Xylenes	5.11e-003	1.16e-003
C8+ Heavies	8.52e-003	3.11e-003
Total Components	100.00	8.89e+000

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.57e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	1.47e+001	9.74e-003
Ethane	2.81e+001	3.50e-002
Propane	2.76e+001	5.04e-002
Isobutane	4.64e+000	1.12e-002
n-Butane	1.62e+001	3.91e-002
Isopentane	2.44e+000	7.29e-003
n-Pentane	3.47e+000	1.04e-002
n-Hexane	7.49e-001	2.67e-003
Cyclohexane	3.11e-001	1.08e-003
Other Hexanes	9.27e-001	3.31e-003
Heptanes	8.73e-002	3.62e-004
Methylcyclohexane	1.97e-001	8.02e-004
2,2,4-Trimethylpentane	2.60e-003	1.23e-005
Benzene	5.64e-001	1.83e-003
Toluene	1.20e-002	4.58e-005
Xylenes	5.28e-003	2.32e-005
C8+ Heavies	8.81e-003	6.21e-005

Total Components	100.00	1.73e-001

CONDENSER CONTROL CURVE DATA REPORT:

CONDENSER CONTROL EFFICIENCY CURVES

Note: Condenser curves computed for the range 40.0 F <= T <= 170.0 F. DO NOT EXTRAPOLATE BEYOND THIS RANGE!

Temp(F)	BTEX	Total HAP	VOC
40.0	89.44	87.71	62.73
45.0	87.53	85.49	61.11
50.0	85.21	82.77	59.33
55.0	82.61	79.73	57.58
60.0	79.76	76.39	55.87
65.0	76.66	72.79	54.19
70.0	73.35	68.95	52.54
75.0	69.87	64.93	50.95
80.0	66.25	60.80	49.40
85.0	62.54	56.60	47.91
90.0	58.79	52.42	46.49
95.0	55.05	48.31	45.13
100.0	51.35	44.32	43.84
105.0	47.72	40.49	42.63
110.0	44.20	36.86	41.49
115.0	40.79	33.44	40.43
120.0	37.52	30.24	39.44
125.0	34.38	27.27	38.51
130.0	31.38	24.50	37.65
135.0	28.51	21.93	36.83
140.0	25.77	19.55	36.05
145.0	23.15	17.33	35.27
150.0	20.64	15.27	34.48
155.0	18.04	13.19	33.55
160.0	15.67	11.33	32.49
165.0	13.31	9.52	31.09
170.0	10.95	7.75	29.05

ANNUAL AIR-COOLED CONDENSER PERFORMANCE:

ANNUAL AIR-COOLED CONDENSER PERFORMANCE

Nearest Site for Air Temperature Data: Elkins, WV

Ambient Air Dry Bulb Temperature (deg. F)	Frequency (%)	Condenser Outlet Temperature (deg. F)
<=50	49.57	<=70
51-55	8.52	71-75
56-60	9.28	76-80
61-65	10.35	81-85
66-70	8.85	86-90
71-75	6.15	91-95
76-80	4.62	96-100
81-85	2.09	101-105
86-90	0.52	106-110
91-95	0.06	111-115

96-100	0.00	116-120	
>100	0.00	>120	

Condenser outlet temperature approach to ambient: 20.00 deg. F

Annual air-cooled condenser emissions and control efficiency:

	Uncontrolled emissions tons/year	Controlled emissions tons/year	% Control
Benzene	2.032	0.803	60.46
BTEX	2.590	0.851	67.14
Total HAP	5.370	2.045	61.92
VOC	67.710	33.875	49.97

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Sand Hill Compressor Station - Gas Pumps
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Gas - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

DESCRIPTION:

Description: Three identical dehydration units
Sand Hill Gas Analysis 2/26/15
55 MMSCFD/7.5 gpm
Still vent condenser/combustion; flash tank
combustion 98% - excess
recycled/recompressed

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 103.00 deg. F
Pressure: 950.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.0960
Nitrogen	0.3450
Methane	73.1340
Ethane	16.5830
Propane	6.2040
Isobutane	0.6960
n-Butane	1.7500
Isopentane	0.3540
n-Pentane	0.4420
n-Hexane	0.1154
Cyclohexane	0.0110
Other Hexanes	0.1460
Heptanes	0.0250
Methylcyclohexane	0.0134
2,2,4-Trimethylpentane	0.0015
Benzene	0.0016
Toluene	0.0001
Xylenes	0.0001
C8+ Heavies	0.0819

DRY GAS:

Flow Rate: 55.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 7.5 gpm

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Temperature: 120.0 deg. F
Pressure: 50.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 52.0 deg. F
Pressure: 14.1 psia

Control Device: Combustion Device
Destruction Efficiency: 98.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 52.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Sand Hill Compressor Station - Gas Pumps
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Sand Hill\2015 Sept R13 Mod App\February 2016 dehy update\2016-03-08 Sand Hill_Gas - 55 mm - 2-26-15 analysis 950 psi 7.5 gpm.ddf
Date: March 08, 2016

DESCRIPTION:

Description: Three identical dehydration units
Sand Hill Gas Analysis 2/26/15
55 MMSCFD/7.5 gpm
Still vent condenser/combustion; flash tank
combustion 98% - excess
recycled/recompressed

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0133	0.319	0.0583
Ethane	0.0227	0.544	0.0994
Propane	0.0286	0.686	0.1252
Isobutane	0.0060	0.144	0.0263
n-Butane	0.0195	0.468	0.0854
Isopentane	0.0038	0.092	0.0168
n-Pentane	0.0052	0.125	0.0227
n-Hexane	0.0014	0.034	0.0061
Cyclohexane	0.0006	0.015	0.0028
Other Hexanes	0.0017	0.041	0.0074
Heptanes	0.0002	0.006	0.0010
Methylcyclohexane	0.0005	0.012	0.0023
2,2,4-Trimethylpentane	<0.0001	<0.001	<0.0001
Benzene	0.0014	0.034	0.0063
Toluene	<0.0001	0.001	0.0002
Xylenes	<0.0001	<0.001	0.0001
C8+ Heavies	0.0001	0.001	0.0002
Total Emissions	0.1051	2.523	0.4605
Total Hydrocarbon Emissions	0.1051	2.523	0.4605
Total VOC Emissions	0.0691	1.659	0.3028
Total HAP Emissions	0.0029	0.069	0.0127
Total BTEX Emissions	0.0015	0.036	0.0065

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.6682	16.038	2.9269
Ethane	1.1571	27.770	5.0681
Propane	1.5800	37.920	6.9205
Isobutane	0.3747	8.992	1.6411
n-Butane	1.3445	32.269	5.8891

Isopentane	0.3664	8.794	1.6049
n-Pentane	0.6217	14.921	2.7231
n-Hexane	0.3811	9.148	1.6694
Cyclohexane	0.2446	5.870	1.0714
Other Hexanes	0.3369	8.086	1.4757
Heptanes	0.2156	5.174	0.9442
Methylcyclohexane	0.3878	9.307	1.6985
2,2,4-Trimethylpentane	0.0055	0.132	0.0241
Benzene	0.4327	10.386	1.8954
Toluene	0.0419	1.005	0.1834
Xylenes	0.0826	1.982	0.3617
C8+ Heavies	5.1940	124.656	22.7497
Total Emissions	13.4354	322.450	58.8471
Total Hydrocarbon Emissions	13.4354	322.450	58.8471
Total VOC Emissions	11.6101	278.642	50.8521
Total HAP Emissions	0.9438	22.652	4.1340
Total BTEX Emissions	0.5572	13.373	2.4405

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.9218	46.123	8.4175
Ethane	0.9509	22.821	4.1648
Propane	0.5620	13.489	2.4617
Isobutane	0.0873	2.095	0.3824
n-Butane	0.2370	5.687	1.0379
Isopentane	0.0565	1.356	0.2475
n-Pentane	0.0759	1.821	0.3324
n-Hexane	0.0255	0.611	0.1115
Cyclohexane	0.0043	0.103	0.0188
Other Hexanes	0.0301	0.723	0.1320
Heptanes	0.0070	0.167	0.0305
Methylcyclohexane	0.0052	0.125	0.0228
2,2,4-Trimethylpentane	0.0004	0.009	0.0016
Benzene	0.0010	0.023	0.0042
Toluene	0.0001	0.001	0.0003
Xylenes	<0.0001	0.001	0.0002
C8+ Heavies	0.0150	0.361	0.0659
Total Emissions	3.9799	95.516	17.4317
Total Hydrocarbon Emissions	3.9799	95.516	17.4317
Total VOC Emissions	1.1072	26.572	4.8495
Total HAP Emissions	0.0269	0.645	0.1177
Total BTEX Emissions	0.0011	0.025	0.0046

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	96.0900	2306.161	420.8744
Ethane	47.5433	1141.040	208.2399
Propane	28.1015	674.437	123.0847
Isobutane	4.3652	104.764	19.1194
n-Butane	11.8478	284.347	51.8934
Isopentane	2.8248	67.795	12.3727
n-Pentane	3.7945	91.068	16.6199

n-Hexane	1.2733	30.560	5.5773
Cyclohexane	0.2143	5.143	0.9386
Other Hexanes	1.5066	36.159	6.5990
Heptanes	0.3485	8.364	1.5265
Methylcyclohexane	0.2601	6.242	1.1391
2,2,4-Trimethylpentane	0.0181	0.434	0.0793
Benzene	0.0475	1.141	0.2082
Toluene	0.0029	0.070	0.0128
Xylenes	0.0022	0.053	0.0097
C8+ Heavies	0.7517	18.041	3.2925
Total Emissions	198.9925	4775.821	871.5872
Total Hydrocarbon Emissions	198.9925	4775.821	871.5872
Total VOC Emissions	55.3591	1328.619	242.4730
Total HAP Emissions	1.3441	32.259	5.8873
Total BTEX Emissions	0.0527	1.264	0.2307

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	52.00 deg. F
Condenser Pressure:	14.08 psia
Condenser Duty:	2.26e-002 MM BTU/hr
Hydrocarbon Recovery:	0.66 bbls/day
Produced Water:	9.65 bbls/day
Ambient Temperature:	52.00 deg. F
Excess Oxygen:	0.00 %
Combustion Efficiency:	98.00 %
Supplemental Fuel Requirement:	2.26e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	1.99%	98.01%
Ethane	1.96%	98.04%
Propane	1.81%	98.19%
Isobutane	1.60%	98.40%
n-Butane	1.45%	98.55%
Isopentane	1.05%	98.95%
n-Pentane	0.84%	99.16%
n-Hexane	0.37%	99.63%
Cyclohexane	0.26%	99.74%
Other Hexanes	0.50%	99.50%
Heptanes	0.11%	99.89%
Methylcyclohexane	0.13%	99.87%
2,2,4-Trimethylpentane	0.14%	99.86%
Benzene	0.33%	99.67%
Toluene	0.08%	99.92%
Xylenes	0.02%	99.98%
C8+ Heavies	0.00%	100.00%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	4.71 lbs. H2O/MMSCF
Temperature:	103.0 deg. F
Pressure:	950.0 psig
Dry Gas Flow Rate:	55.0000 MMSCF/day
Glycol Losses with Dry Gas:	1.7094 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	66.20 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	3.19 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.11%	92.89%
Carbon Dioxide	99.82%	0.18%
Nitrogen	99.98%	0.02%
Methane	99.99%	0.01%
Ethane	99.96%	0.04%
Propane	99.94%	0.06%
Isobutane	99.93%	0.07%
n-Butane	99.91%	0.09%
Isopentane	99.92%	0.08%
n-Pentane	99.89%	0.11%
n-Hexane	99.85%	0.15%
Cyclohexane	99.30%	0.70%
Other Hexanes	99.88%	0.12%
Heptanes	99.75%	0.25%
Methylcyclohexane	99.31%	0.69%
2,2,4-Trimethylpentane	99.89%	0.11%
Benzene	93.76%	6.24%
Toluene	92.07%	7.93%
Xylenes	86.89%	13.11%
C8+ Heavies	99.42%	0.58%

FLASH TANK

Flash Control:	Combustion device
Flash Control Efficiency:	98.00 %
Flash Temperature:	120.0 deg. F
Flash Pressure:	50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.77%	0.23%
Carbon Dioxide	8.13%	91.87%
Nitrogen	0.65%	99.35%
Methane	0.69%	99.31%
Ethane	2.38%	97.62%
Propane	5.32%	94.68%
Isobutane	7.90%	92.10%
n-Butane	10.19%	89.81%
Isopentane	11.66%	88.34%
n-Pentane	14.28%	85.72%
n-Hexane	23.25%	76.75%
Cyclohexane	54.58%	45.42%
Other Hexanes	18.68%	81.32%

Heptanes	38.42%	61.58%
Methylcyclohexane	61.23%	38.77%
2,2,4-Trimethylpentane	23.84%	76.16%
Benzene	90.59%	9.41%
Toluene	93.98%	6.02%
Xylenes	97.72%	2.28%
C8+ Heavies	88.64%	11.36%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	31.01%	68.99%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.76%	98.24%
n-Pentane	1.64%	98.36%
n-Hexane	1.20%	98.80%
Cyclohexane	5.01%	94.99%
Other Hexanes	2.67%	97.33%
Heptanes	0.88%	99.12%
Methylcyclohexane	5.59%	94.41%
2,2,4-Trimethylpentane	2.95%	97.05%
Benzene	5.42%	94.58%
Toluene	8.29%	91.71%
Xylenes	13.14%	86.86%
C8+ Heavies	11.48%	88.52%

STREAM REPORTS:

WET GAS STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.30e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e-001	1.52e+002
Carbon Dioxide	9.59e-002	2.55e+002
Nitrogen	3.45e-001	5.84e+002
Methane	7.30e+001	7.09e+004
Ethane	1.66e+001	3.01e+004
Propane	6.20e+000	1.65e+004
Isobutane	6.95e-001	2.44e+003
n-Butane	1.75e+000	6.14e+003
Isopentane	3.54e-001	1.54e+003

n-Pentane	4.41e-001	1.93e+003
n-Hexane	1.15e-001	6.01e+002
Cyclohexane	1.10e-002	5.59e+001
Other Hexanes	1.46e-001	7.60e+002
Heptanes	2.50e-002	1.51e+002
Methylcyclohexane	1.34e-002	7.95e+001
2,2,4-Trimethylpentane	1.50e-003	1.04e+001
Benzene	1.60e-003	7.55e+000
Toluene	9.99e-005	5.57e-001
Xylenes	9.99e-005	6.41e-001
C8+ Heavies	8.18e-002	8.43e+002
Total Components	100.00	1.33e+005

DRY GAS STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 2.29e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.93e-003	1.08e+001
Carbon Dioxide	9.58e-002	2.55e+002
Nitrogen	3.45e-001	5.84e+002
Methane	7.31e+001	7.09e+004
Ethane	1.66e+001	3.01e+004
Propane	6.20e+000	1.65e+004
Isobutane	6.96e-001	2.44e+003
n-Butane	1.75e+000	6.14e+003
Isopentane	3.54e-001	1.54e+003
n-Pentane	4.42e-001	1.92e+003
n-Hexane	1.15e-001	6.00e+002
Cyclohexane	1.09e-002	5.55e+001
Other Hexanes	1.46e-001	7.59e+002
Heptanes	2.49e-002	1.51e+002
Methylcyclohexane	1.33e-002	7.89e+001
2,2,4-Trimethylpentane	1.50e-003	1.03e+001
Benzene	1.50e-003	7.08e+000
Toluene	9.21e-005	5.13e-001
Xylenes	8.69e-005	5.57e-001
C8+ Heavies	8.14e-002	8.38e+002
Total Components	100.00	1.33e+005

LEAN GLYCOL STREAM

Temperature: 103.00 deg. F
Flow Rate: 7.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	4.16e+003
Water	1.50e+000	6.33e+001
Carbon Dioxide	1.08e-012	4.58e-011
Nitrogen	2.34e-013	9.89e-012
Methane	8.14e-018	3.44e-016
Ethane	1.33e-007	5.62e-006

Propane	9.16e-009	3.87e-007
Isobutane	1.25e-009	5.27e-008
n-Butane	3.34e-009	1.41e-007
Isopentane	1.56e-004	6.57e-003
n-Pentane	2.46e-004	1.04e-002
n-Hexane	1.10e-004	4.63e-003
Cyclohexane	3.06e-004	1.29e-002
Other Hexanes	2.19e-004	9.25e-003
Heptanes	4.51e-005	1.91e-003
Methylcyclohexane	5.44e-004	2.30e-002
2,2,4-Trimethylpentane	3.95e-006	1.67e-004
Benzene	5.87e-004	2.48e-002
Toluene	8.97e-005	3.79e-003
Xylenes	2.96e-004	1.25e-002
C8+ Heavies	1.60e-002	6.73e-001
Total Components	100.00	4.22e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 103.00 deg. F
Pressure: 964.70 psia
Flow Rate: 8.25e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.08e+001	4.16e+003
Water	4.47e+000	2.05e+002
Carbon Dioxide	1.68e-002	7.69e-001
Nitrogen	1.77e-002	8.12e-001
Methane	2.11e+000	9.68e+001
Ethane	1.06e+000	4.87e+001
Propane	6.49e-001	2.97e+001
Isobutane	1.04e-001	4.74e+000
n-Butane	2.88e-001	1.32e+001
Isopentane	6.99e-002	3.20e+000
n-Pentane	9.67e-002	4.43e+000
n-Hexane	3.63e-002	1.66e+000
Cyclohexane	1.03e-002	4.72e-001
Other Hexanes	4.05e-002	1.85e+000
Heptanes	1.24e-002	5.66e-001
Methylcyclohexane	1.47e-002	6.71e-001
2,2,4-Trimethylpentane	5.19e-004	2.38e-002
Benzene	1.10e-002	5.05e-001
Toluene	1.06e-003	4.86e-002
Xylenes	2.13e-003	9.73e-002
C8+ Heavies	1.45e-001	6.62e+000
Total Components	100.00	4.58e+003

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 64.70 psia
Flow Rate: 3.30e+003 scfh

Component	Conc.	Loading

	(vol%)	(lb/hr)
Water	2.95e-001	4.62e-001
Carbon Dioxide	1.85e-001	7.07e-001
Nitrogen	3.31e-001	8.06e-001
Methane	6.89e+001	9.61e+001
Ethane	1.82e+001	4.75e+001
Propane	7.33e+000	2.81e+001
Isobutane	8.64e-001	4.37e+000
n-Butane	2.34e+000	1.18e+001
Isopentane	4.50e-001	2.82e+000
n-Pentane	6.05e-001	3.79e+000
n-Hexane	1.70e-001	1.27e+000
Cyclohexane	2.93e-002	2.14e-001
Other Hexanes	2.01e-001	1.51e+000
Heptanes	4.00e-002	3.49e-001
Methylcyclohexane	3.05e-002	2.60e-001
2,2,4-Trimethylpentane	1.82e-003	1.81e-002
Benzene	7.00e-003	4.75e-002
Toluene	3.65e-004	2.93e-003
Xylenes	2.41e-004	2.22e-003
C8+ Heavies	5.07e-002	7.52e-001
Total Components	100.00	2.01e+002

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 7.80e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.50e+001	4.16e+003
Water	4.67e+000	2.04e+002
Carbon Dioxide	1.43e-003	6.26e-002
Nitrogen	1.21e-004	5.30e-003
Methane	1.53e-002	6.68e-001
Ethane	2.65e-002	1.16e+000
Propane	3.61e-002	1.58e+000
Isobutane	8.57e-003	3.75e-001
n-Butane	3.07e-002	1.34e+000
Isopentane	8.53e-003	3.73e-001
n-Pentane	1.44e-002	6.32e-001
n-Hexane	8.82e-003	3.86e-001
Cyclohexane	5.89e-003	2.58e-001
Other Hexanes	7.91e-003	3.46e-001
Heptanes	4.97e-003	2.17e-001
Methylcyclohexane	9.39e-003	4.11e-001
2,2,4-Trimethylpentane	1.29e-004	5.66e-003
Benzene	1.05e-002	4.58e-001
Toluene	1.04e-003	4.57e-002
Xylenes	2.17e-003	9.51e-002
C8+ Heavies	1.34e-001	5.87e+000
Total Components	100.00	4.37e+003

FLASH GAS EMISSIONS

Flow Rate: 1.29e+004 scfh
Control Method: Combustion Device
Control Efficiency: 98.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.21e+001	3.81e+002
Carbon Dioxide	3.73e+001	5.59e+002
Nitrogen	8.45e-002	8.06e-001
Methane	3.52e-001	1.92e+000
Ethane	9.28e-002	9.51e-001
Propane	3.74e-002	5.62e-001
Isobutane	4.41e-003	8.73e-002
n-Butane	1.20e-002	2.37e-001
Isopentane	2.30e-003	5.65e-002
n-Pentane	3.09e-003	7.59e-002
n-Hexane	8.67e-004	2.55e-002
Cyclohexane	1.49e-004	4.29e-003
Other Hexanes	1.03e-003	3.01e-002
Heptanes	2.04e-004	6.97e-003
Methylcyclohexane	1.55e-004	5.20e-003
2,2,4-Trimethylpentane	9.30e-006	3.62e-004
Benzene	3.57e-005	9.51e-004
Toluene	1.86e-006	5.85e-005
Xylenes	1.23e-006	4.44e-005
C8+ Heavies	2.59e-004	1.50e-002
Total Components	100.00	9.45e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.05e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.73e+001	1.41e+002
Carbon Dioxide	1.77e-002	6.26e-002
Nitrogen	2.36e-003	5.30e-003
Methane	5.18e-001	6.68e-001
Ethane	4.79e-001	1.16e+000
Propane	4.46e-001	1.58e+000
Isobutane	8.02e-002	3.75e-001
n-Butane	2.88e-001	1.34e+000
Isopentane	6.32e-002	3.66e-001
n-Pentane	1.07e-001	6.22e-001
n-Hexane	5.50e-002	3.81e-001
Cyclohexane	3.62e-002	2.45e-001
Other Hexanes	4.86e-002	3.37e-001
Heptanes	2.68e-002	2.16e-001
Methylcyclohexane	4.91e-002	3.88e-001
2,2,4-Trimethylpentane	5.99e-004	5.50e-003
Benzene	6.89e-002	4.33e-001
Toluene	5.65e-003	4.19e-002
Xylenes	9.68e-003	8.26e-002
C8+ Heavies	3.79e-001	5.19e+000
Total Components	100.00	1.54e+002

CONDENSER PRODUCED WATER STREAM

Temperature: 52.00 deg. F
Flow Rate: 2.82e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.41e+002	999779.
Carbon Dioxide	1.98e-003	2.79e-003	20.
Nitrogen	2.87e-006	4.04e-006	0.
Methane	8.23e-004	1.16e-003	8.
Ethane	2.10e-003	2.96e-003	21.
Propane	1.22e-003	1.72e-003	12.
Isobutane	1.53e-004	2.15e-004	2.
n-Butane	7.19e-004	1.01e-003	7.
Isopentane	1.11e-004	1.57e-004	1.
n-Pentane	1.71e-004	2.41e-004	2.
n-Hexane	4.46e-005	6.29e-005	0.
Cyclohexane	1.49e-004	2.10e-004	1.
Other Hexanes	4.08e-005	5.75e-005	0.
Heptanes	4.53e-006	6.38e-006	0.
Methylcyclohexane	6.12e-005	8.62e-005	1.
2,2,4-Trimethylpentane	9.25e-008	1.30e-007	0.
Benzene	1.40e-002	1.97e-002	140.
Toluene	3.19e-004	4.49e-004	3.
Xylenes	2.17e-004	3.06e-004	2.
C8+ Heavies	1.93e-007	2.72e-007	0.
Total Components	100.00	1.41e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 52.00 deg. F
Flow Rate: 1.92e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	1.40e-002	1.14e-003
Carbon Dioxide	4.70e-003	3.83e-004
Nitrogen	4.69e-005	3.83e-006
Methane	2.12e-002	1.73e-003
Ethane	2.43e-001	1.98e-002
Propane	1.84e+000	1.50e-001
Isobutane	9.07e-001	7.40e-002
n-Butane	4.52e+000	3.68e-001
Isopentane	2.14e+000	1.75e-001
n-Pentane	4.44e+000	3.62e-001
n-Hexane	3.82e+000	3.11e-001
Cyclohexane	2.61e+000	2.12e-001
Other Hexanes	3.09e+000	2.52e-001
Heptanes	2.50e+000	2.04e-001
Methylcyclohexane	4.44e+000	3.62e-001
2,2,4-Trimethylpentane	6.28e-002	5.12e-003
Benzene	4.19e+000	3.41e-001
Toluene	4.87e-001	3.97e-002
Xylenes	9.98e-001	8.14e-002
C8+ Heavies	6.37e+001	5.19e+000

Total Components	100.00	8.15e+000

CONDENSER VENT STREAM

Temperature: 52.00 deg. F
Pressure: 14.08 psia
Flow Rate: 5.57e+001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.39e+000	3.68e-002
Carbon Dioxide	9.19e-001	5.94e-002
Nitrogen	1.29e-001	5.30e-003
Methane	2.82e+001	6.65e-001
Ethane	2.57e+001	1.13e+000
Propane	2.21e+001	1.43e+000
Isobutane	3.52e+000	3.00e-001
n-Butane	1.14e+001	9.75e-001
Isopentane	1.81e+000	1.92e-001
n-Pentane	2.45e+000	2.60e-001
n-Hexane	5.52e-001	6.99e-002
Cyclohexane	2.59e-001	3.20e-002
Other Hexanes	6.69e-001	8.47e-002
Heptanes	7.84e-002	1.15e-002
Methylcyclohexane	1.79e-001	2.58e-002
2,2,4-Trimethylpentane	2.24e-003	3.75e-004
Benzene	6.26e-001	7.18e-002
Toluene	1.29e-002	1.74e-003
Xylenes	5.86e-003	9.14e-004
C8+ Heavies	1.13e-002	2.83e-003
Total Components	100.00	5.36e+000

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.09e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	2.89e+001	1.33e-002
Ethane	2.63e+001	2.27e-002
Propane	2.26e+001	2.86e-002
Isobutane	3.61e+000	6.01e-003
n-Butane	1.17e+001	1.95e-002
Isopentane	1.85e+000	3.83e-003
n-Pentane	2.51e+000	5.19e-003
n-Hexane	5.66e-001	1.40e-003
Cyclohexane	2.66e-001	6.41e-004
Other Hexanes	6.86e-001	1.69e-003
Heptanes	8.04e-002	2.31e-004
Methylcyclohexane	1.83e-001	5.15e-004
2,2,4-Trimethylpentane	2.29e-003	7.51e-006
Benzene	6.41e-001	1.44e-003
Toluene	1.32e-002	3.49e-005
Xylenes	6.00e-003	1.83e-005
C8+ Heavies	1.16e-002	5.65e-005

Total Components	100.00	1.05e-001

CONDENSER CONTROL CURVE DATA REPORT:

CONDENSER CONTROL EFFICIENCY CURVES

Note: Condenser curves computed for the range 40.0 F <= T <= 170.0 F. DO NOT EXTRAPOLATE BEYOND THIS RANGE!

Temp(F)	BTEX	Total HAP	VOC
40.0	90.83	89.53	73.19
45.0	89.21	87.65	71.94
50.0	87.38	85.53	70.69
55.0	85.36	83.19	69.45
60.0	83.29	80.79	68.30
65.0	80.90	78.02	67.08
70.0	78.32	75.05	65.86
75.0	75.57	71.90	64.66
80.0	72.67	68.59	63.47
85.0	69.64	65.16	62.29
90.0	66.50	61.63	61.14
95.0	63.28	58.06	60.02
100.0	60.01	54.47	58.92
105.0	56.70	50.90	57.85
110.0	53.39	47.38	56.81
115.0	50.09	43.94	55.81
120.0	46.82	40.59	54.85
125.0	43.59	37.36	53.92
130.0	40.42	34.24	53.02
135.0	37.31	31.24	52.15
140.0	34.25	28.37	51.29
145.0	31.26	25.62	50.43
150.0	28.32	22.97	49.55
155.0	25.42	20.42	48.59
160.0	22.57	17.96	47.47
165.0	19.49	15.36	45.98
170.0	16.55	12.92	43.96

ANNUAL AIR-COOLED CONDENSER PERFORMANCE:

ANNUAL AIR-COOLED CONDENSER PERFORMANCE

Nearest Site for Air Temperature Data: Elkins, WV

Ambient Air Dry Bulb Temperature (deg. F)	Frequency (%)	Condenser Outlet Temperature (deg. F)
<=50	49.57	<=70
51-55	8.52	71-75
56-60	9.28	76-80
61-65	10.35	81-85
66-70	8.85	86-90
71-75	6.15	91-95
76-80	4.62	96-100
81-85	2.09	101-105
86-90	0.52	106-110
91-95	0.06	111-115

96-100	0.00	116-120	
>100	0.00	>120	

Condenser outlet temperature approach to ambient: 20.00 deg. F

Annual air-cooled condenser emissions and control efficiency:

	Uncontrolled emissions tons/year	Controlled emissions tons/year	% Control
Benzene	1.895	0.618	67.38
BTEX	2.440	0.653	73.25
Total HAP	4.134	1.269	69.31
VOC	50.852	18.384	63.85

TANKS 4.0.9d
Emissions Report - Summary Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Sand Hill Compressor Station: 1 of 8 Condensate
City:	
State:	West Virginia
Company:	Appalachia Midstream Services, LLC
Type of Tank:	Vertical Fixed Roof Tank
Description:	One (1) of eight (8) 400-bbl Condensate Tanks

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	19.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	16,074.56
Turnovers:	19.60
Net Throughput(gal/yr):	315,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

TANKS 4.0.9d
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Sand Hill Compressor Station: 1 of 8 Condensate - Vertical Fixed Roof Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 15.0)	All	51.94	47.06	56.81	50.33	7.0149	6.3924	7.6845	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

Sand Hill Compressor Station: 1 of 8 Condensate - Vertical Fixed Roof Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 15.0)	3,156.71	1,424.69	4,581.40

element

Element Materials Technology
2139 West Willow Street
Scott, LA
70583-5301 USA

P 337 232 3568
F 337 232 3621
T 888 786 7555
info.scott@element.com
element.com

GAS ANALYSIS REPORT NO.: 21-030515-42 (372061) **DATE:** 03/05/15

FOR: ACCESS MIDSTREAM
ATTN: DEE BAILEY
190 MIDSTREAM WAY
JANE LEW WV 26378

SAMPLE IDENTIFICATION:
COMPANY: ACCESS MIDSTREAM
FIELD: N/P
LEASE: SANDHILL UPSTREAM OF DEH
STA #:

SAMPLE DATA: **DATE:** 02/26/15 10:00 **BY:** F. RODAK
PSIG: 950 **TEMP:** 103 **DEG.F.** **DP:** N/P **LBS H20**

REMARKS: WET GAS

CYL #1239

SAMPLE TYPE: SPOT **EFFECTIVE DATE:** 03/01/15

HYDROCARBON ANALYSIS - METHOD GPA 2261-13 **LAB ANALYST:** MP

COMPONENT NAME		MOL PERCENT	GPM @ 14.730 PSIA
HYDROGEN SULFIDE	(H2S)	0.000	
CARBON DIOXIDE	(CO2)	0.096	
NITROGEN	(N2)	0.345	
METHANE	(C1)	73.134	
ETHANE	(C2)	16.583	4.434
PROPANE	(C3)	6.204	1.709
ISO-BUTANE	(IC4)	0.696	0.228
N-BUTANE	(NC4)	1.750	0.552
ISO-PENTANE	(IC5)	0.354	0.129
N-PENTANE	(NC5)	0.442	0.160
HEXANES PLUS	(C6+)	0.396	0.164
TOTAL		100.000	

MOL WEIGHT: 21.95
BTU/LB: 22816.0

ETHANE + GPM: 7.376
PROPANE + GPM: 2.942
ISO-PENTANE + GPM: 0.453

COMPRESSIBILITY FACTOR: 0.9959
SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1): 0.761

BTU/CUFT. (REAL) 60 DEG.F. - PSIA:	14.650	14.696	14.730	15.025
DRY:	1320.8	1324.9	1328.0	1354.6
SAT:	1297.6	1301.8	1304.9	1331.4

REVIEWED BY: Lisa Venable

DATE: 03/05/15

SAMPLE IDENTIFICATION

COMPANY: ACCESS MIDSTREAM
FIELD: N/P
LEASE: SANDHILL UPSTREAM OF DEH
STA #:

SAMPLE DATE: 02/26/15
(372061)

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
METHANE	0.0000	0.0000
ETHANE	0.0000	0.0000
PROPANE	0.0000	0.0000
ISO-BUTANE	0.0000	0.0000
N-BUTANE	0.0000	0.0000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0000	0.0000
ISOPENTANE	0.0000	0.0000
N-PENTANE	0.0000	0.0000
2,2-DIMETHYLBUTANE (NEOHEXANE)	0.0079	0.0312
2,3-DIMETHYLBUTANE CYCLOPENTANE	0.0146	0.0519
2-METHYLPENTANE	0.0778	0.3060
3-METHYLPENTANE	0.0457	0.1794
N-HEXANE	0.1154	0.4514
2,2-DIMETHYLPENTANE	0.0019	0.0085
METHYLCYCLOPENTANE	0.0120	0.0460
2,4-DIMETHYLPENTANE	0.0002	0.0011
2,2,3-TRIMETHYLBUTANE	0.0005	0.0021
BENZENE	0.0016	0.0057
3,3-DIMETHYLPENTANE	0.0010	0.0047
CYCLOHEXANE	0.0110	0.0424
2-METHYLHEXANE	0.0168	0.0766
2,3-DIMETHYLPENTANE	0.0041	0.0186
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	0.0178	0.0809
1,t3-DIMETHYLCYCLOPENTANE	0.0011	0.0052
1,c3-DIMETHYLCYCLOPENTANE 3-ETHYLPENTANE	0.0024	0.0108

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
1,t2-DIMETHYLCYCLOPENTANE 2,2,4-TRIMETHYLPENTANE	0.0015	0.0070
N-HEPTANE	0.0250	0.1142
METHYLCYCLOHEXANE 1,1,3-TRIMETHYLCYCLOPENTANE 2,2-DIMETHYLHEXANE	0.0134	0.0608
1,C2-DIMETHYLCYCLOPENTANE	0.0002	0.0008
2,5-DIMETHYLHEXANE	0.0000	0.0000
2,4-DIMETHYLHEXANE 2,2,3-TRIMETHYLPENTANE ETHYLCYCLOPENTANE	0.0008	0.0037
1,t2,c4-TRIMETHYLCYCLOPENTANE 3,3-DIMETHYLHEXANE	0.0017	0.0085
1,t2,c3-TRIMETHYLCYCLOPENTANE	0.0006	0.0030
2,3,4-TRIMETHYLPENTANE	0.0002	0.0009
TOLUENE	0.0001	0.0005
2,3-DIMETHYLHEXANE	0.0020	0.0103
1,1,2-TRIMETHYLCYCLOPENTANE	0.0006	0.0032
2-METHYLHEPTANE	0.0031	0.0160
4-METHYLHEPTANE	0.0013	0.0069
3,4-DIMETHYLHEXANE	0.0003	0.0017
3-METHYLHEPTANE 3-ETHYLHEXANE	0.0036	0.0187
1,c3-DIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOPENTANE 1,c2,t4-TRIMETHYLCYCLOPENTANE	0.0015	0.0078
1,t4-DIMETHYLCYCLOHEXANE	0.0007	0.0036
2,2,5-TRIMETHYLHEXANE	0.0000	0.0003
1,1-DIMETHYLCYCLOHEXANE 1,methyl-t3-ETHYLCYCLOPENTANE	0.0004	0.0019
1-methyl-c3-ETHYLCYCLOPENTANE	0.0002	0.0010
1-methyl-t2-ETHYLCYCLOPENTANE 2,2,4-TRIMETHYLHEXANE	0.0000	0.0000
1-methyl-1-ETHYLCYCLOPENTANE CYCLOHEPTANE N-OCTANE	0.0038	0.0196
1,T2-DIMETHYLCYCLOCHEXANE	0.0002	0.0011

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
UNKNOWN	0.0000	0.0002
1,t3-DIMETHYLCYCLOHEXANE 1,c4-DIMETHYLCYCLOHEXANE 1,c2,c3-TRIMETHYLCYCLOPENTANE	0.0004	0.0020
2,4,4-TRIMETHYLHEXANE	0.0000	0.0001
ISOPROPYLCYCLOPENTANE	0.0000	0.0002
UNKNOWN	0.0000	0.0002
2,2-DIMETHYLHEPTANE	0.0000	0.0003
2,4-DIMETHYLHEPTANE 1-methyl-c2-ETHYLCYCLOPENTANE	0.0001	0.0008
2,2,3-TRIMETHYLHEXANE	0.0000	0.0002
1,c2-DIMETHYLCYCLOHEXANE 2,6-DIMETHYLHEPTANE	0.0001	0.0008
N-PROPYLCYCLOPENTANE 1,c3,c5-TRIMETHYLCYCLOHEXANE	0.0001	0.0006
2,5-DIMETHYLHEPTANE 3,5-DIMETHYLHEPTANE ETHYLCYCLOHEXANE	0.0006	0.0032
1,1,3-TRIMETHYLCYCLOHEXANE 2,3,3-TRIMETHYLHEXANE 3,3-DIMETHYLHEPTANE	0.0001	0.0006
1,1,4-TRIMETHYLCYCLOHEXANE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
2,3,4-TRIMETHYLHEXANE	0.0000	0.0002
ETHYLBENZENE	0.0000	0.0000
1,t2,t4-TRIMETHYLCYCLOHEXANE 1,c3,t5-TRIMETHYLCYCLOHEXANE 2,3-DIMETHYLHEPTANE	0.0001	0.0004
M-XYLENE P-XYLENE 3,4-DIMETHYLHEPTANE	0.0001	0.0006
2-METHYLOCTANE 4-METHYLOCTANE	0.0006	0.0034
UNKNOWN	0.0003	0.0020
3-METHYLOCTANE	0.0002	0.0013
UNKNOWN	0.0000	0.0000
1,t2,c3-TRIMETHYLCYCLOHEXANE 1,t2,c4-TRIMETHYLCYCLOHEXANE	0.0000	0.0001

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
O-XYLENE	0.0001	0.0004
1,1,2-TRIMETHYLCYCLOHEXANE	0.0000	0.0002
UNKNOWN	0.0000	0.0003
ISOBUTYLCYCLOPENTANE	0.0000	0.0001
N-NONANE	0.0002	0.0014
UNKNOWN	0.0000	0.0000
1,c2,c3-TRIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOHEXANE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
ISOPROPYLBENZENE	0.0000	0.0002
2,2-DIMETHYLOCTANE	0.0000	0.0001
ISOPROPYLCYCLOHEXANE CYCLOOCTANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOPENTANE N-PROPYLCYCLOHEXANE	0.0000	0.0001
3,3-DIMETHYLOCTANE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
N-PROPYLBENZENE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
m-ETHYLTOLUENE	0.0000	0.0000
p-ETHYLTOLUENE 2,3-DIMETHYLOCTANE	0.0000	0.0001
4-METHYLNONANE 5-METHYLNONANE 1,3,5-TRIMETHYLBENZENE	0.0000	0.0001
2-METHYLNONANE	0.0000	0.0000
3-ETHYLOCTANE	0.0000	0.0003
O-ETHYLTOLUENE 3-METHYLNONANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
1,2,4-TRIMETHYLBENZENE t-BUTYLBENZENE METHYLCYCLOOCTANE	0.0000	0.0000
tert-BUTYLCYCLOHEXANE	0.0000	0.0001

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
ISO-BUTYLCYCLOHEXANE	0.0000	0.0000
N-DECANE	0.0000	0.0001
ISOBUTYLBENZENE	0.0000	0.0000
sec-BUTYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
1-METHYL-3-ISOPROPYLBENZENE	0.0000	0.0000
1,2,3-TRIMETHYLBENZENE 1-METHYL-4-ISOPROPYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
1-METHYL-2-ISOPROPYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOHEXANE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
1,3-DIETHYLBENZENE 1-METHYL-3-PROPYLBENZENE	0.0000	0.0000
1,2-DIETHYLBENZENE N-BUTYLBENZENE 1-METHYL-4-PROPYLBENZENE	0.0000	0.0000
1,4-DIETHYLBENZENE	0.0000	0.0000
1-METHYL-2-PROPYLBENZENE	0.0000	0.0001
1,4-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
1,2-DIMETHYL-4-ETHYLBENZENE	0.0000	0.0000
1,3-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
1,2-DIMETHYL-3-ETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
N-UNDECANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
1,2,4,5-TETRAMETHYLBENZENE	0.0000	0.0000
1,2,3,5-TETRAMETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
1,2,3,4-TETRAMETHYLBENZENE CYCLODECANE	0.0000	0.0000

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
UNKNOWN	0.0000	0.0001
NAPHTHALENE	0.0000	0.0000
N-DODECANE	0.0000	0.0002
ISOTRIDECANES PLUS	0.0000	0.0000
TOTALS	0.3960	1.6360

TOTAL HEXANES	=	0.2614	1.0199
TOTAL HEPTANES	=	0.0969	0.4238
TOTAL OCTANES	=	0.0347	0.1703
TOTAL NONANES	=	0.0030	0.0198
TOTAL DECANES PLUS	=	0.0000	0.0022

DATE: 03/05/15

SAMPLE IDENTIFICATION

COMPANY: ACCESS MIDSTREAM
FIELD: N/P
LEASE: SANDHILL UPSTREAM OF DEH
STA #:

SAMPLE DATE: 02/26/15
(372061)

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
METHANE	0.000	0.000
ETHANE	0.000	0.000
PROPANE	0.000	0.000
ISO-BUTANE	0.000	0.000
N-BUTANE	0.000	0.000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.000	0.000
ISOPENTANE	0.000	0.000
N-PENTANE	0.000	0.000
2,2-DIMETHYLBUTANE (NEOHEXANE)	2.002	1.906
2,3-DIMETHYLBUTANE CYCLOPENTANE	3.678	3.173
2-METHYLPENTANE	19.658	18.704
3-METHYLPENTANE	11.532	10.967
N-HEXANE	28.971	27.558
2,2-DIMETHYLPENTANE	0.471	0.521
METHYLCYCLOPENTANE	3.026	2.812
2,4-DIMETHYLPENTANE	0.063	0.067
2,2,3-TRIMETHYLBUTANE	0.118	0.131
BENZENE	0.408	0.350
3,3-DIMETHYLPENTANE	0.263	0.288
CYCLOHEXANE	2.790	2.591
2-METHYLHEXANE	4.230	4.683
2,3-DIMETHYLPENTANE	1.024	1.137
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	4.484	4.946
1,t3-DIMETHYLCYCLOPENTANE	0.290	0.317

COMPONENT	MOL PERCENT	WT. PERCENT
1,c3-DIMETHYLCYCLOPENTANE 3-ETHYLPENTANE	0.607	0.659
1,t2-DIMETHYLCYCLOPENTANE 2,2,4-TRIMETHYLPENTANE	0.390	0.426
N-HEPTANE	6.305	6.978
METHYLCYCLOHEXANE 1,1,3-TRIMETHYLCYCLOPENTANE 2,2-DIMETHYLHEXANE	3.379	3.717
1,C2-DIMETHYLCYCLOPENTANE	0.045	0.050
2,5-DIMETHYLHEXANE	0.000	0.000
2,4-DIMETHYLHEXANE 2,2,3-TRIMETHYLPENTANE ETHYLCYCLOPENTANE	0.199	0.228
1,t2,c4-TRIMETHYLCYCLOPENTANE 3,3-DIMETHYLHEXANE	0.417	0.518
1,t2,c3-TRIMETHYLCYCLOPENTANE	0.145	0.185
2,3,4-TRIMETHYLPENTANE	0.045	0.056
TOLUENE	0.027	0.029
2,3-DIMETHYLHEXANE	0.498	0.629
1,1,2-TRIMETHYLCYCLOPENTANE	0.163	0.197
2-METHYLHEPTANE	0.779	0.980
4-METHYLHEPTANE	0.335	0.422
3,4-DIMETHYLHEXANE	0.082	0.105
3-METHYLHEPTANE 3-ETHYLHEXANE	0.906	1.142
1,c3-DIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOPENTANE 1,c2,t4-TRIMETHYLCYCLOPENTANE	0.390	0.478
1,t4-DIMETHYLCYCLOHEXANE	0.172	0.217
2,2,5-TRIMETHYLHEXANE	0.009	0.018
1,1-DIMETHYLCYCLOHEXANE 1,methyl-t3-ETHYLCYCLOPENTANE	0.091	0.116
1-methyl-c3-ETHYLCYCLOPENTANE	0.045	0.061
1-methyl-t2-ETHYLCYCLOPENTANE 2,2,4-TRIMETHYLHEXANE	0.000	0.000
1-methyl-1-ETHYLCYCLOPENTANE CYCLOHEPTANE N-OCTANE	0.951	1.197

COMPONENT	MOL PERCENT	WT. PERCENT
1,T2-DIMETHYLCYCLOCHEXANE	0.054	0.069
UNKNOWN	0.009	0.010
1,t3-DIMETHYLCYCLOHEXANE 1,c4-DIMETHYLCYCLOHEXANE 1,c2,c3-TRIMETHYLCYCLOPENTANE	0.100	0.123
2,4,4-TRIMETHYLHEXANE	0.000	0.006
ISOPROPYLCYCLOPENTANE	0.009	0.011
UNKNOWN	0.009	0.014
2,2-DIMETHYLHEPTANE	0.009	0.019
2,4-DIMETHYLHEPTANE 1-methyl-c2-ETHYLCYCLOPENTANE	0.036	0.049
2,2,3-TRIMETHYLHEXANE	0.009	0.010
1,c2-DIMETHYLCYCLOHEXANE 2,6-DIMETHYLHEPTANE	0.036	0.046
N-PROPYLCYCLOPENTANE 1,c3,c5-TRIMETHYLCYCLOHEXANE	0.027	0.039
2,5-DIMETHYLHEPTANE 3,5-DIMETHYLHEPTANE ETHYLCYCLOHEXANE	0.154	0.196
1,1,3-TRIMETHYLCYCLOHEXANE 2,3,3-TRIMETHYLHEXANE 3,3-DIMETHYLHEPTANE	0.027	0.036
1,1,4-TRIMETHYLCYCLOHEXANE	0.009	0.014
UNKNOWN	0.000	0.003
2,3,4-TRIMETHYLHEXANE	0.009	0.011
ETHYLBENZENE	0.000	0.000
1,t2,t4-TRIMETHYLCYCLOHEXANE 1,c3,t5-TRIMETHYLCYCLOHEXANE 2,3-DIMETHYLHEPTANE	0.018	0.027
M-XYLENE P-XYLENE 3,4-DIMETHYLHEPTANE	0.036	0.039
2-METHYLOCTANE 4-METHYLOCTANE	0.145	0.206
UNKNOWN	0.082	0.125
3-METHYLOCTANE	0.054	0.081
UNKNOWN	0.000	0.000

COMPONENT	MOL PERCENT	WT. PERCENT
1,t2,c3-TRIMETHYLCYCLOHEXANE 1,t2,c4-TRIMETHYLCYCLOHEXANE	0.009	0.008
O-XYLENE	0.018	0.026
1,1,2-TRIMETHYLCYCLOHEXANE	0.009	0.012
UNKNOWN	0.009	0.018
ISOBUTYLCYCLOPENTANE	0.009	0.008
N-NONANE	0.063	0.084
UNKNOWN	0.000	0.000
1,c2,c3-TRIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOHEXANE	0.000	0.000
UNKNOWN	0.000	0.000
ISOPROPYLBENZENE	0.009	0.010
2,2-DIMETHYLOCTANE	0.000	0.004
ISOPROPYLCYCLOHEXANE CYCLOOCTANE	0.009	0.009
UNKNOWN	0.000	0.001
N-BUTYLCYCLOPENTANE N-PROPYLCYCLOHEXANE	0.009	0.009
3,3-DIMETHYLOCTANE	0.000	0.000
UNKNOWN	0.000	0.002
N-PROPYLBENZENE	0.009	0.014
UNKNOWN	0.000	0.002
m-ETHYLTOLUENE	0.000	0.002
p-ETHYLTOLUENE 2,3-DIMETHYLOCTANE	0.000	0.004
4-METHYLNONANE 5-METHYLNONANE 1,3,5-TRIMETHYLBENZENE	0.000	0.005
2-METHYLNONANE	0.000	0.000
3-ETHYLOCTANE	0.009	0.019
O-ETHYLTOLUENE 3-METHYLNONANE	0.000	0.004
UNKNOWN	0.000	0.001
1,2,4-TRIMETHYLBENZENE t-BUTYLBENZENE METHYLCYCLOOCTANE	0.000	0.002

COMPONENT	MOL PERCENT	WT. PERCENT
tert-BUTYLCYCLOHEXANE	0.000	0.006
ISO-BUTYLCYCLOHEXANE	0.000	0.001
N-DECANE	0.009	0.008
ISOBUTYLBENZENE	0.000	0.001
sec-BUTYLBENZENE	0.000	0.002
UNKNOWN	0.000	0.000
1-METHYL-3-ISOPROPYLBENZENE	0.000	0.000
1,2,3-TRIMETHYLBENZENE 1-METHYL-4-ISOPROPYLBENZENE	0.000	0.000
UNKNOWN	0.000	0.000
1-METHYL-2-ISOPROPYLBENZENE	0.000	0.003
UNKNOWN	0.000	0.001
N-BUTYLCYCLOHEXANE	0.000	0.000
UNKNOWN	0.000	0.002
1,3-DIETHYLBENZENE 1-METHYL-3-PROPYLBENZENE	0.000	0.000
1,2-DIETHYLBENZENE N-BUTYLBENZENE 1-METHYL-4-PROPYLBENZENE	0.000	0.000
1,4-DIETHYLBENZENE	0.000	0.000
1-METHYL-2-PROPYLBENZENE	0.000	0.004
1,4-DIMETHYL-2-ETHYLBENZENE	0.000	0.004
UNKNOWN	0.000	0.004
1,2-DIMETHYL-4-ETHYLBENZENE	0.000	0.000
1,3-DIMETHYL-2-ETHYLBENZENE	0.000	0.000
UNKNOWN	0.000	0.000
1,2-DIMETHYL-3-ETHYLBENZENE	0.000	0.000
UNKNOWN	0.000	0.000
N-UNDECANE	0.000	0.007
UNKNOWN	0.000	0.000
1,2,4,5-TETRAMETHYLBENZENE	0.000	0.000
1,2,3,5-TETRAMETHYLBENZENE	0.000	0.000
UNKNOWN	0.000	0.000

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
1,2,3,4-TETRAMETHYLBENZENE	0.000	0.003
CYCLODECANE		
UNKNOWN	0.000	0.004
NAPHTHALENE	0.000	0.003
N-DODECANE	0.009	0.010
ISOTRIDECANES PLUS	0.000	0.000
TOTALS	100.000	100.000

SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1)	3.1282
MOLECULAR WEIGHT	90.59
COMPRESSIBILITY FACTOR	0.8894
SUMMATION FACTOR	0.0867
CU. FT. VAPOR/GAL @ 14.696 PSIA & 60 DEG. F.	24.138
CU. FT. VAPOR/GAL @ 14.730 PSIA & 60 DEG. F.	24.082
BTU/CU.FT. @ 14.696 PSIA, DRY	4956.20
BTU/CU.FT. @ 14.730 PSIA, DRY	4967.70
BTU/LB	20778

west virginia department of environmental protection

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

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

March 3, 2016

CERTIFIED MAIL
91 7199 9991 7034 1380 3236

Mr. Don Wicburg
Vice President, Northeast
PO Box 18312
Oklahoma City, OK 73154-0312

Entire Document
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RE: **Application Status: Notice of Deficiency**
Appalachian Midstream Services, LLC
Sand Hill Station
Permit Application: R13-2913A
Plant ID No.: 051-00145

Dear Mr. Wicburg:

Your application for an after-the-fact modification permit was received by the Division of Air Quality (DAQ) on September 14, 2015 and assigned to the writer for review. After an initial review, on October 14, 2015, additional administrative information was requested. After the submission of the additional administrative information, the permit application was deemed complete via e-mail on October 30, 2015. This e-mail stated that the "*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.*"

On January 6, 2015, in an e-mail to an environmental contact for AMS, it was stated that the technical review of the permit application found a potential error in the calculation of the emissions associated with the flash tank off-gases. Specifically, the e-mail stated:

> ... the R13-2913A permit application for Sand Hill states that "Flash tank off-gases from the glycol regeneration skid will also be routed to the reboiler to be burned as fuel with 98% destruction efficiency." This makes sense, and a DRE of 98% is used to calculate the controlled emissions from the dehy still vents. The controlled emissions from the flash tanks, however, are given as zero due to the compression/recycle setting in the GLY-Calc run. However, as compression/recycle is a backup option, I believe the worst-case should be calculated that flash tank gases are sent to the reboiler for a 98% control. Let me know what you think.

On February 8, 2016, in response to an e-mail requesting clarification on how to address the problem, it was stated in an e-mail response to an environmental contact for AMS, the preferable method was to submit a revised permit application:

Yes, as the change in emissions will affect many pages, I would prefer if you just submitted a revised permit application (hard copy and electronic copy). That way I don't have to change out a bunch of specific pages. This will not trigger a new permitting action, however, so you will not need to place a new ad. Please submit it under a cover letter signed by a Responsible Official.

Changes should include a new Gly-Calc run w/98% selected for flash tank emissions, revised facility-wide emissions, and any other sheets that will change as a result of the recalculation (like the Emission Points Data Sheet)

As of the date of this letter, the requested information has not yet been submitted. If it is not possible to submit this information within fifteen (15) calendar days from the date of receipt of this letter, the DAQ now prefers AMS to withdraw the current permit application and submit a new permit application (using all normal procedures) reflecting the changes noted above.

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.

Sincerely,

Joe Kessler, PE
Engineer

c: Mr. Dave Morris (via e-mail)
Williams OVM

Ms. Erika Baldauff (via e-mail)
Williams OVM

Kessler, Joseph R

From: Kessler, Joseph R
Sent: Friday, October 30, 2015 3:43 PM
To: don.wicburg@williams.com
Cc: Hong, Kijun (Kijun.Hong@williams.com)
Subject: WV DAQ NSR Permit Application Complete for Appalachian Midstream Services, LLC: Sand Hill Station

RE: Application Status: Complete
Appalachian Midstream Services, LLC
Sand Hill Station
Permit Application: R13-2913A
Plant ID No.: 051-00145

Entire Document
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Mr. Wicburg,

Your application for a modification permit was received by the Division of Air Quality (DAQ) on September 14, 2015 and assigned to the writer for review. Pursuant to §45-13-5.9, after an initial review of the permit application (and with the submission of the required information), the application has, of the date of this e-mail, 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

Kessler, Joseph R

From: Ward, Beth A
Sent: Wednesday, October 28, 2015 11:58 AM
To: Kessler, Joseph R
Subject: Appalachia Midstream Services LLC Permit Application Fee

This is the receipt for payment received from:

Appalachia Midstream Services LLC, Sand Hill Station, ck# 3420000009, ck date 10/21/2015, $1000.00 R13-2913A, id no 051-00145

OASIS Deposit CR 1600047514

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

Kessler, Joseph R

From: Ward, Beth A
Sent: Wednesday, October 14, 2015 12:23 PM
To: Kessler, Joseph R
Subject: APPALACHIAN MIDSTREAM SERVICES PERMIT APPLICATION FEE

This is the receipt for payment received from:

APPALACHIAN MIDSTREAM SERVICES, LLC, SAND HILL STATION, CHECK NUMBER 3390057547, CHECK DATE 09/21/2015, $2,500.00
R13-2913A ID# 051-00145

OASIS Deposit CR 1600041436

Thank You!

Beth Ward

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

Kessler, Joseph R

From: Ward, Beth A
Sent: Wednesday, October 14, 2015 2:52 PM
To: Kessler, Joseph R
Subject: RE: R13-2334Y Permit Application Fee Confirmation

Payment was deposited on September 17, 2015 OASIS ID 1600030935 Appalachia Midstream Services ck# 3390057080 id 051-00145 R13-2913A

Thank You!

From: Kessler, Joseph R
Sent: Wednesday, October 14, 2015 1:40 PM
To: Ward, Beth A
Subject: RE: R13-2334Y Permit Application Fee Confirmation

Sorry, I meant should have been another one from Appalachian Midstream Services R13-2913A $1,000 about 9/14. It was in the original e-mail. Thanks for checking these; we used to get these notices when accounting got the checks. We need to verify payment before deeming an application complete.

Joe

From: Ward, Beth A
Sent: Wednesday, October 14, 2015 1:37 PM
To: Kessler, Joseph R
Subject: FW: R13-2334Y Permit Application Fee Confirmation

Is the email I sent to you this morning the payment you are looking for with Ergon?

From: Ward, Beth A
Sent: Wednesday, October 14, 2015 10:43 AM
To: Kessler, Joseph R
Subject: RE: R13-2334Y Permit Application Fee Confirmation

Payment was made by check # 803903 for $1,000, OASIS ID 1600030935

Thank You!

From: Kessler, Joseph R
Sent: Wednesday, October 14, 2015 10:30 AM
To: Ward, Beth A
Subject: R13-2334Y Permit Application Fee Confirmation

$1,000 on or about September 16, 2015 – probably a check.

R13-2334Y
Ergon

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

UC Defaulted Accounts Search Results

Sorry, no records matching your criteria were found.

FEIN:
Business name: APPALACHIA MIDSTREAM SERVICES, 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: 263678972
Business name:
Doing business as/Trading as:

Please use your browsers back button to try again.

WorkforceWV	Unemployment Compensation	Offices of the Insurance Commissioner

Appalachia
MIDSTREAM SERVICES

October 26, 2015

VIA UPS Overnight

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

Entire Document
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Re: NSPS Application Fee
Appalachia Midstream Services, LLC
Sand Hill Station
Plant ID No. 051-00145
Application No. R13-2913A

I.D. No. 051-00145 Reg. 2913A
Company AMS
Facility SAND HILL Region
Initials MH

Dear Mr. Kessler:

Appalachia Midstream Services, L.L.C. (AMS) submitted a R13 Permit Modification Application on September 9, 2015, for the Sand Hill Station.

Please find included a check for $1,000 to cover the NSPS application fee.

Should you have any questions or require further information, please feel free to contact me at 405-727-1245 or by e-mail at AirGroup@Williams.com.

Sincerely,

Kijun Hong
Specialist - Air
Appalachia Midstream Services, L.L.C.

Appalachia Midstream Services, L.L.C.
P.O. Box 54382
Oklahoma City, OK 73154-1382

Kessler, Joseph R

From: Kessler, Joseph R
Sent: Wednesday, October 14, 2015 2:27 PM
To: 'don.wicburg@williams.com'
Cc: Hong, Kijun (Kijun.Hong@williams.com)
Subject: R13-2913A Permit Application Review Status

RE: Application Status: Incomplete
Appalachian Midstream Services, LLC (AMS)
Sand Hill Station
Permit Application: R13-2913A
Plant ID No.: 051-00145

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Dear Mr. Wicburg:

Your application for a modification to the Sand Hill Station was received by the Division of Air Quality (DAQ) on September 14, 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. Pursuant to 45-22-3.4, an additional fee of $1,000 is required for modifications involving equipment/processes subject to a New Source Performance Standard (NSPS); and
2. Please provide a description of the relationship between Williams Ohio Valley Midstream and AMS to verify that Mr. Don Wicburg meets the definition of "Responsible Official" under 45-13-2.22 for AMS.

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

Appalachia
MIDSTREAM SERVICES

October 9, 2015

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VIA UPS Overnight

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

Re: Affidavit of Publication of Class I Legal Advertisement
Appalachia Midstream Services, LLC
Sand Hill Station
Plant ID No. 051-00145
Application No. R13-2913A

I.D. No. 051-00145 Reg. 2913A
Company AMS
Facility Sand Hill Region
Initials

Dear Mr. Kessler:

Appalachia Midstream Services, L.L.C. (AMS) submitted a R13 Permit Modification Application on September 9, 2015, for the Sand Hill Station. AMS hereby submits the Affidavit of Publication of Class I Legal Advertisement regarding the above mentioned application. The public notice for the proposed modifications was published in the Intelligencer newspaper published in the city of Wheeling on September 11, 2015.

Also, please find included a check for $2,500 to cover the NESHAP application fee.

Should you have any questions or require further information, please feel free to contact me at 405-727-1245 or by e-mail at AirGroup@Williams.com.

Sincerely,

Kijun Hong
Specialist - Air
Appalachia Midstream Services, L.L.C.

Appalachia Midstream Services, L.L.C.
P.O. Box 54382
Oklahoma City, OK 73154-1382

AIR QUALITY
PERMIT NOTICE
Notice of Application

Notice is given that Appalachia Midstream Services, L.L.C. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a R13 Permit Modification to Permit No. R13-2913 for the Sand Hill Compressor Station located at 1594 McCausland Hill Road near Dallas, Marshall County, West Virginia.

The latitude and longitude coordinates are: 39.987535, -80.555860

The applicant estimates the increased potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx) 82.37 tons/yr

Carbon Monoxide (CO) 75.30 tons/yr

Volatile Organic Compounds (VOC) 98.04 tons/yr

Particulate Matter (PM) 6.84 tons/yr

Sulfur Dioxide (SO2) 0.50 tons/yr

Acetaldehyde 5.45 tons/yr
Acrolein 3.35 tons/yr

Benzene 0.38 tons/yr

Ethylbenzene 0.08 tons/yr

Formaldehyde 3.22 tons/yr

Methanol 1.63 tons/yr

n-Hexane 2.15 tons/yr

Toluene 0.33 tons/yr

Xylenes 0.34 tons/yr

The application is being submitted to authorize: reduced control efficiencies claimed for the oxidative catalysts, revise emissions from the dehydration units, fugitives, and blowdowns using updated gas analysis, and revise greenhouse gas emissions using the current Global Warming Potential multipliers.

Startup of the modifications is planned to begin immediately upon permit issuance. 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 11th day of September, 2015.

By: Appalachia Midstream Services, L.L.C.
Don Wicburg
Vice President -Northeast
P.O. Box 18312
Oklahoma City, OK
73154-0312
Int. Sept. 11, 2015

STATE OF WEST VIRGINIA,
COUNTY OF OHIO,

I Sharon Sadlowski *for the publisher of the* **Intelligencer** *newspaper published in the CITY OF WHEELING, STATE OF WEST VIRGINIA, hereby certify that the annexed publication was inserted in said newspaper on the following dates:*

Sept 11, 2015

Given under my hand this 2ND *day of* Oct, 2015

Sworn to and subscribed before me this 2nd *day of* October, 2015 *at WHEELING, OHIO COUNTY, WEST VIRGINIA*

Michelle Higgins
Notary Public

of, in and for OHIO COUNTY, WEST VIRGINIA.

My Commission expires Aug 11, 2020

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
MICHELLE HIGGINS
Wheeling Newspapers
1500 Main Street
Wheeling, West Virginia 26003
My Commission Expires Aug. 11, 2020

Adkins, Sandra K

From:	Adkins, Sandra K
Sent:	Thursday, September 17, 2015 12:14 PM
To:	'don.wicburg@williams.com'; 'airgroup@williams.com'
Cc:	McKeone, Beverly D; Kessler, Joseph R
Subject:	UPDATE to WV DAQ Permit Application Status for Appalachia Midstream Services, LLC; Sand Hill Station

Email being resent to update assigned engineer to Joe Kessler

RE: Application Status
Appalachia Midstream Services, LLC
Sand Hill Station
Plant ID No. 051-00145
Application No. R13-2913A

Entire Document
NON-CONFIDENTIAL

Mr. Wicburg,

Your application for a modification permit for the Sand Hill Station was received by this Division on September 14, 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 the new phone extension 1250 for future legal ads. Ad must include LON/LAT – needs to be republished.*

Application fee AND/OR additional application fees not included:
****$2,500 NESHAP***

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.

For future reference, electronic applications must include signatures.

Should you have any questions, please contact the assigned engineer, Joe Kessler, at 304-926-0499, extension 1219.