Permit Writer	Edward Andrews
Email Address	edward.s.andrews@wv.gov
Company Name	Appalachia Midstream Services, LLC
Company ID	051-00130
Facility Name	Miller Compressor Station
Permit Number	R13-2831E
County	Marshall
Newspaper	*Moundsville Daily Echo* 845-2660
Company Contact & Email	Kristin Ikard Kristin.Ikard@williams.com
Consultant Email Address	N/A
Regional Office (if applicable)	NRPO - Angela Carey

Publish Tues Dec 22 2015
30 days Thurs Jan 21 2016
email ok re publish date 12/18pm

INTERNAL PERMITTING DOCUMENT TRACKING MANIFEST

Company Name AMS - Miller C.S.

Permitting Action Number R13-2831E Total Days 223 DAQ Days 23

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
11/10	Ed	Ben	Please Review
12/18	Ben	Ed	See Comments - Addition to Notice

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

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

Company:	Appalachia Midstream Services, LLC			**Facility:**	Miller Station
Region:	1	**Plant ID:**	051-00130	**Application #:**	13-2831E
Engineer:	Andrews, Edward S.			**Category:**	
Physical Address:	CR 1/22 Johnson Ridge Rd Miller Station Cameron WV 26033			SIC: [1311] OIL AND GAS EXTRACTION - CRUDE PETROLEUM & NATURAL GAS NAICS: [211111] Crude Petroleum and Natural Gas Extraction SIC: [4923] ELECTRIC, GAS AND SANITARY SERVICES - GAS TRANSMISSION AND DISTRIBUTION NAICS: [221210] Natural Gas Distribution	
County:	Marshall				
Other Parties:	Gen_Mgr - DeLaune, Randy 405-935-6159				

Information Needed for Database and AIRS
No required information is missing.

Regulated Pollutants

CO	Carbon Monoxide	88.630 TPY
PM10	Particulate Matter < 10 um	8.830 TPY
SO2	Sulfur Dioxide	1.680 TPY
VOC	Volatile Organic Compounds (Reactive organic gases)	74.540 TPY
THAP	Total HAP Pollutants	15.150 TPY
NOX	Nitrogen Oxides (including NO, NO2, NO3, N2O3, N2O4, and N2O5)	77.460 TPY
CO2E	Carbon Dioxide Equivalents	82169.390 TPY

Summary from this Permit 13-2831E

Air Programs		**Applicable Regulations**
		02 06 10 60 JJJJ 63 HH
Fee Program	**Fee**	**Application Type**
	$2,000.00	MODIFICATION

Activity Dates

APPLICATION RECIEVED	04/01/2015
APPLICATION FEE PAID	04/06/2015
ASSIGNED DATE	04/06/2015
APPLICANT PUBLISHED LEGAL AD	04/10/2015
APPLICATION DEEMED COMPLETE	10/19/2015

Notes from Database
Permit Note: This action is for the removal of EPCE-1 (Waukesha engine); Replacemnet of EPCE-9 EPCE-10, EPCE-11 with like kind engines (Caterpillar); and adding one Caterpillar Engine. New PTE includes compressor Blowdown emissions and update dehy emission due to new gas analysis.

West Virginia Department of Environmental Protection

Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Modify

R13-2831E

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, LLC
Miller Compressor Station
051-00130

Entire Document
NON-CONFIDENTIAL

William F. Durham
Director

Issued: DRAFT

This permit will supercede and replace Permit R13-2831D.

Facility Location:	County Road 1/22 (Johnson Ridge) Bannen, Marshall County, West Virginia
Mailing Address:	P.O. Box 54368 Oklahoma City, OK 73154-1368
Facility Description:	Natural Gas Production Compressor Station
NAICS Codes:	211111
UTM Coordinates:	532.48 km Easting • 4,396.73 km Northing • Zone 17
Permit Type:	Modification
Description of Change:	This action is for the replacement of four compressor engines (EPCE-1, EPCE-9, EPCE-10, EPCE-11) with Caterpillar G3516B compressor engines, account for compressor blowdown emissions, and other miscellaneous emission sources due to undated gas analysis.

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-2	EPCE-2	Waukesha L5794 Compressor Engine Engine SN: C-17723/1 Unit ID: AC3780	2010	1,380 hp	NSCR
EUCE-3	EPCE-3	Waukesha L5794 Compressor Engine Engine SN: C-17563/1 Unit ID: AC3574	2010	1,380 hp	NSCR
EUCE-4	EPCE-4	Waukesha L5794 Compressor Engine Engine SN: C-17570/1 Unit ID: AC3572	2010	1,380 hp	NSCR
EUCE-5	EPCE-5	Waukesha L5794 Compressor Engine Engine SN: C17771/1 Unit ID: AC3578	2010	1,380 hp	NSCR
EUCE-6	EPCE-6	Waukesha L5794 Compressor Engine Engine SN: C17569/1 Unit ID: AC3573	2010	1,380 hp	NSCR
EUCE-7	EPCE-7	Caterpillar G3516B Compressor Engine Engine SN: JEF01492 Unit ID: MC4113 Compressor SN:F-37392 Compressor DOM: 4/1/2014	2012	1,380 hp	Oxid. Cat.
EUCE-8	EPCE-8	Caterpillar G3516B Compressor Engine Engine SN: JEF01462 Unit ID: MC4112 Compressor SN: F-37820 Compressor DOM: 1/06/2012	2012	1,380 hp	Oxid. Cat.
EUCE-12	EPCE-12	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-13	EPCE-13	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-14	EPCE-14	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-15	EPCE-15	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EP-BD		Compressors Blowdown Vent	2010	N/A	N/A
EUGEN-1	EPGEN-1	Capstone C600 Micro Turbine Generator	2010	805 hp	None
EUGEN-2	EPGEN-2	Capstone C600 Micro Turbine Generator	2010	805 hp	None
EUGEN-3	EPGEN-3	Capstone C600 Micro Turbine Generator	2015	805 hp	None
EUDHY-1	EPSTL-1	TEG Glycol Dehydration Unit Still Vent	2010	53.8 MMscfd	APCCOND-1
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-1	Glycol Reboiler		1.0 mmBtu/hr	None
EUDHY-2	EPSTL-2	Glycol Dehydration Unit Still Vent	2010	53.8 MMscfd	APCCOND-2
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-2	Glycol Reboiler		1.0 mmBtu/hr	None
EUDHY-3	EPSTL-3	Glycol Dehydration Unit Still Vent	2012	53.8 MMscfd	APCCOND-3
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-3	Glycol Reboiler		1.0 mmBtu/hr	None
EUTK-1	EPTK-1	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-2	EPTK-2	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-3	EPTK-3	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-4	EPTK-4	Stabilized Condensate Storage Tank	2010	400 bbl	VRU

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
EUTK-5	EPTK-5	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-6	EPTK-6	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-7	EPTK-7	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-8	EPTK-8	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-9	EPTK-9	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-10	EPTK-10	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-11	EPTK-11	Pipeline Fluids/Water Storage Tank	2010	400 bbl	VRU
EUTK-12	EPTK-12	Pipeline Fluids/Water Storage Tank	2010	400 bbl	VRU
EULOR	EPLOR	Tanker Loadout Rack	2010	NA	ACC
EUOH-1	EPOH-1	Hot Oil Heater	2010	3.35 MMBTU/hr	None
APCFLARE	APCFLARE	Pressure Assisted Flare	2010	65 scfh (pilot) 6154,116 scfh	None

NSCR – Non-selective catalytic reduction
Oxid Cat. - Oxidation catalyst
VRU – Vapor Recovery Unit
ACC - Activated Carbon Canister

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 Act 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 supersedes and replaces previously issued Permit R13-2831D. 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 R13-2831, R13-2831A, R13-2831B, R13-2831C, R13-2831D, R13-2831E, 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; and

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.]

3.1.7. 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.

3.2. Monitoring Requirements

3.2.1. For the purpose of demonstrating compliance with emission sources subject to 45 CSR §10-5.1, the permittee shall conduct gas sampling at a point that is representative of the incoming natural gas to the facility and analyzing the sample to determine the hydrogen sulfide content of the sample. At the minimum, such sampling and analysis shall be conducted once per year. Once per

year shall mean between 11 months to 13 months from the previous gas sampling. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. of this permit.
[45 CSR §10-8.3.a.]

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.*]

3.4.3. The permittee shall maintained documentation of the VOCs and HAPs in the fuel gas consumed in the permitted emission units at the facility. Such documentation may either be gas analysis of the fuel gas or predicted analysis that used acceptable process simulator with the actual facility operating parameters and most recent gas analysis of the incoming wet gas to the facility. Such records shall be maintained in accordance with Condition 3.4.1.

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

3.5.4. Operating Fee

3.5.4.1. In accordance with 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.

3.5.5. **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. Specific Requirements for the Compressor Engines and Associated Compressors

4.1. Limitations and Standards

4.1.1. The following conditions and requirements are specific to the engines identified as EUCE-2, EUCE-3, EUCE-4, EUCE-5, and EUCE-6:

a. Emissions from each engine shall not exceed the following:

i. The mass rate of NO_x emissions from each engine shall not exceed 1.48 pounds per hour and 6.48 tpy. Verification of the mass rate limit is satisfied if the measured concentration of NO_x does not exceed 37.76 ppmvd corrected to 15% oxygen during performance testing.

ii. The mass rate of CO emissions from each engine shall not exceed 1.81 pounds per hour and 7.92 tpy. Verification of the mass rate limit is satisfied if the measured concentration of CO does not exceed 75.43 ppmvd corrected to 15% oxygen during performance testing.

iii. The mass rate of VOC emissions shall not exceed 0.22 pounds per hour and 0.95 tpy. Formaldehyde is excluded from this VOC limit. Verification of the mass rate limit is satisfied if the measured concentration of VOCs does not exceed 5.86 ppmvd corrected to 15% oxygen during performance testing.
[40 CFR §60.4333(e) & Table 1 to Subpart JJJJ of Part 60—NOx, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP]

iv. Formaldehyde emissions from each engine shall not exceed 0.08 pounds per hour and 0.33 tpy.

b. Each engine shall be equipped with non-selective catalytic reduction (NSCR) air pollution control device.

c. Each engine shall be equipped with air to fuel controller. 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.
[40 CFR §60.4243(g)]

d. Each engine shall be equipped with a non-resettable hour meter.

e. Compliance with the mass emission limits in item a of this condition is satisfied by Compiling with Condition 4.1.4.

4.1.2. The following conditions and requirements are specific to the internal combustion engines identified as EUCE-7, EUCE-8, EUCE-9, EUCE-12, EUCE-13, and EUCE-14 and compressors driven by such engines:

a. Emissions from the engine shall not exceed the following:

i. The mass rate of NO_x emissions shall not exceed 1.52 pounds per hour and 6.66 tpy. Verification of the mass rate limit is satisfied if the measured concentration of NO_x does not exceed 40.11 ppmvd corrected to 15% oxygen during performance testing.

ii. The mass rate of CO emissions shall not exceed 1.52 pounds per hour and 6.66 tpy. Verification of the mass rate limit is satisfied if the measured concentration of CO does not exceed 65.77 ppmvd corrected to 15% oxygen during performance testing.

iii. The mass rate of VOC emissions shall not exceed 1.10 pounds per hour and 4.84 tpy. Formaldehyde is excluded from this VOC limit. Verification of the mass rate limit is satisfied if the measured concentration of VOCs does not exceed 30.29 ppmvd corrected to 15% oxygen during performance testing.
[40 CFR §60.4333(e) & Table 1 to Subpart JJJJ of Part 60—NOx, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP]

iv. Formaldehyde emissions from each engine shall not exceed 0.31 pounds per hour and 1.38 tpy.

b. Each engine shall be equipped with oxidation catalytic air pollution control device.

c. Each engine shall be equipped with a non-resettable hour meter.

d. Compliance with the mass emission limits in item a. of this condition is satisfied by Compiling with item b.

e. The rod packing for each compressor shall be replace once every 26,000 hours of operation
[40 CFR §60.5385(a)(1)]

4.1.3. The permittee shall only operate these engines using fuel gas generator by the condensate stabilizer.

4.1.4. Requirements for Use of Catalytic Reduction Devices

a. Rich-bum natural gas compressor engines (EPCE-2 – EPCE-6) equipped with non-selective catalytic reduction (NSCR) air pollution control devices shall be fitted with a closed-loop, automatic air/fuel ratio controller to ensure emissions of regulated pollutants do not exceed the potential to emit for any engine/NSCR combination under varying load. The closed-loop, automatic air/fuel ratio controller shall control a fuel metering valve to ensure a fuel-rich mixture and a resultant exhaust oxygen content of less than or equal to 0.5%.
[40CFR§60.4243(g)]

b. For natural gas compressor engines (EPCE-2 – 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. At least once per calendar quarter, the permittee shall conduct portable analyzer strip checks of Nitrogen Oxides (NO_x and Carbon Monoxide (CO) emissions from the engines when operating under representative conditions for that period to ensure proper operation of the catalytic reduction devices. The portable analyzer strip checks shall be conducted using the following procedure:

1. 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.

2. 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 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.

3. 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.

d. Upon request by the Director or his/her duly authorized representative, testing shall be conducted using a portable analyzer in accordance with the MidCon Compression portable analyzer protocol submitted with Permit Application R13-2831B or other approved methods. Such controls shall ensure proper and efficient operation of the engine and air pollution control devices.

e. During any calendar quarter when a performance test is required under Section 4.3 of this permit, those test results will satisfy the requirements of item c of this condition in lieu of a portable analyzer strip check.

4.1.5. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.2. Monitoring Requirements

4.2.1. The permittee shall maintain a maintenance plan 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.
[40 CFR §60.4243(b)(2)(ii)]

4.2.2. The permittee shall monitor and record the hours of operation through the non-resettable hour meter for each engine on a monthly basis and record the number of hours the engine operated using propane. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.
[40CFR§60.4245(b)]

4.3. Testing Requirements

4.3.1. The permittee must conduct an initial performance testing for engines EUCE-9, EUCE-10, EUCE-11, and EUCE-12 within one year of initial startup of each corresponding engine. Such testing shall be conducted in accordance with Condition 4.3.2.

[40 CFR §60.4243(a)(2)(iii)]

4.3.2. The permittee must conduct performance testing on each engine every 8,760 hours of operation or once every three years, whichever comes first. Such testing shall be conducted in accordance with the following the procedures and Condition 3.3.1.

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 Subpart JJJJ.
[40CFR§60.4244(a)]

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

c. Permittee 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. If the permittee 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)]

Records of such testing shall be maintained in accordance with Condition 3.4.1.
[40CFR§60.4243(b)]

4.4. Recordkeeping Requirements

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

a. The date, place as defined in this permit, and time of sampling or measurements;

b. The date(s) analyses were performed;

c. The company or entity that performed the analyses;

d. The analytical techniques or methods used;

e. The results of the analyses; and

f. The operating conditions existing at the time of sampling or measurement.

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

4.4.4. For each compressor connected to Engines EUCE-7, EUCE-8, EUCE-12, EUCE-13, EUCE-14, and EUCE-15, the permittee shall maintain records of the following in accordance with Condition 3.4.1.

a. Record the cumulative number of hours of operation since initial startup or the previous replacement of the reciprocating compressor rod packing, whichever is later.

b. Record of the date of the recent replacement of the rod packing.
[40 CFR §60.5385(c)(3)]

4.4.5. The permittee shall maintain records of the monitoring as requirement in Condition 4.1.4. for each engine in accordance with Condition 3.4.1.

4.5. Reporting Requirements

4.5.1. The permittee shall submit annual compliance reports of compliance that indicates compliance with Condition 4.1.2.e. and 40 CFR §60.5385(a)(1) from the compressors connected to Engines EUCE-7, EUCE-8, EUCE-12, EUCE-13, EUCE-14, and EUCE-15 to the Director and Administrator in accordance with Conditions 3.5.1. and 3.5.3. The reporting period of such reports shall begin on October 15 and ends on October 14. Submission of report must be made within 90 days from the end of the reporting period. The permittee may submit one report for multiple affected facilities under Subpart OOOO to Part 60. Such reports shall include the he following information:

i. The company name and address of the affected facility

ii. An identification of each affected facility being included in the annual report.

iii. Beginning and ending dates of the reporting period.

iv. A certification by a certifying official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

v. The records as required in Condition 4.4.4. for each affected compressor.
[40 CFR §60.5420(b) and (b)(4)(ii)]

5.0. Source-Specific Requirements Micro Turbine Generator

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 805 hp natural gas fired micro turbine generator, Capstone C600 (EUGEN-1, EUGEN-2, and EUGEN-3) shall not exceed 6,980 cubic feet per hour and 61.15 x 10^6 cubic feet per year for each turbine.

5.1.2. Maximum emissions from each micro turbine generator (EUGEN-1, EUGEN-2, and EUGEN-3) 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	0.56	2.46
Volatile Organic Compounds	0.01	0.06
Formaldehyde	0.01	0.02

5.2. Recordkeeping Requirements

5.2.1. To demonstrate compliance with Conditions 5.1.1-5.1.2, the permittee shall maintain records of the amount of natural gas consumed in the micro turbine generator and the hours of operation. Said records shall be maintained in accordance with Condition 3.4.1.

6.0. Specific Requirements for the Dehydration Units

6.1. Limitations and Standards

6.1.1. Maximum Throughput Limitation to demonstrate compliance with Condition 6.1.4, 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	53.8 mmscf/day
EPSTL-2	53.8 mmscf/day
EPSTL-3	53.8 mmscf/day

6.1.2. Visible emissions from Emission Point EPRBL-1, EPRBL-2, and EPRBL-3 shall be limited to ten (10) percent opacity or less based on a six (6) minute average. Compliance with this limit is satisfied by complying with Condition 6.1.3.
[45 CSR §2-3.1]

6.1.3. Each reboiler for these dehydration units shall only be fuel with the non-condensable gas from the BTEX condenser, flash tank off gas, or fuel gas skid.

6.1.4. The emissions released from each of these emission points EPRBL-1, EPRBL-2, and EPRBL-3 (combustion stack of the reboiler) shall not exceed the following limits:

Table 10.1.4. Emission Limits for EPRBL-1, EPRBL-2, and EPRBL-3		
Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual* Emissions (ton/year)
Nitrogen Oxides	0.09	0.38
Carbon Monoxide	0.07	0.32
Volatile Organic Compounds	0.50	2.15
Benzene	0.03	0.11
Total HAPs	0.14	0.61

6.1.5. The still vent of each dehydration unit shall be routed to a dedicated BTEX Condenser and BTEX Accumulator (2-phase separator) though a closed vent system. The non-condensable gas from the each BTEX Accumulator shall be vented back to the respective reboiler though a closed vent system.

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

6.1.7. Each dehydration unit (EPRBL-1, EPRBL-2 and EPRBL-3) shall be designed and operated in accordance with the following:

a. The non-condensable gas from the BTEX Accumulator shall be routed to the reboiler and combusted though a closed vent system.

b. The flash tank off-gases from each flash tank shall be routed to flash gas header to the reboiler burner or to the inlet separator of the station for re-processing. The routing of the flash tank off-gases shall be done through a closed vent system.

c. The pilot light for each reboiler burner shall be lit at all times when the dehydration unit is in operation.

d. The maximum flow rate of glycol through each dehydration unit shall not exceed 15 gpm. The unit be operated either with an electric or gas pneumatic driven pumps that does not exceed the above flow rate.

e. The maximum temperature of the outlet stream from the BTEX Condenser shall not exceed 120°F.

6.1.8. The closed vent system as required in Condition 6.1.5. shall meet the following:

a. The system shall be constructed of hard piping

b. The system shall be constructed and maintained free of leaks. A leaking component is defined as a measured instrument reading greater than 500 ppm above background using Method 21 or by visual inspection.

c. Detected leaks shall be repaired as soon as practicable with the first attempt at repair within 5 calendar days after detecting the leak. Repair shall be completed no later than 15 calendar days after the leak is detected.
[45 CSR §13-5.11.]

6.1.9. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

6.2. Monitoring Requirements

6.2.1. The permittee shall monitor and record the following parameters for the purpose of demonstrating compliance with Conditions 6.1.1., and 6.1.4.:

a. The throughput of natural gas processed through each dehydration unit on a daily basis, days the dehydration unit operated, and annual natural gas flowrate.
[40 CFR §63.774(d)(1)]

b. Determine actual annual average natural gas throughput (in terms of natural gas flowrate to the glycol dehydration unit per day) by converting the annual natural gas flowrate to a daily average by dividing the annual flowrate by the number of days per year the glycol dehydration unit processed natural gas.
[40 CFR §63.772(b)(1)(i)]

c. Determination of the actual average benzene emissions from the dehydration unit shall be made using the model GRIGLYCalc™, Version 3.0 or higher, and the procedures presented in the associated GRI-GLYCalc™ Technical Reference Manual. Inputs to the model shall be representative of actual operating conditions of the glycol dehydration unit and may be determined using the procedures documented in the Gas Research Institute (GRI) report entitled "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1).
[40 CFR §63.772(b)(2)(i) & 63.774(d)(1)(ii)]

d. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.

6.2.2. The permittee shall monitor the throughput of liquid gathered in the storage tanks from each of the condensers (APCCOND-1, APCCOND-2, APCCOND-3) on a monthly basis. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.

6.2.3. The permittee shall monitor the temperature of the outlet stream of each BTEX Condenser (APCCOND-1, APCCOND-2, and APCCOND-3) on a daily basis for the purpose of demonstrating compliance with Condition 6.1.8.e. The permittee is may use a portable temperature measuring device. Only one measurement is required to be measured per day if the measured temperature is at or less than 120^0F. For readings above 120^0F, the permittee shall take additional measurements in equal time intervals to develop a 3-hour average. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. and include the time and date of measurements.

6.2.4. The permittee shall conduct an annual inspection for each component of the closed vent system that is for the control of fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if the permittee determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown. Records of such inspections shall be maintained in accordance with Condition 3.4.1
[45CSR§13-5.11.]

6.3. Recordkeeping Requirements

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

6.3.3. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.6.3.4.

6.3.4. For the purpose of demonstrating compliance with section 3.1.7. and 6.1.6, 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.

7.0. Specific Requirements for the APCFLARE

7.1. Limitation and Standards

7.1.1. The permittee shall install a flare (APCFLARE) to control VOC emissions from upset conditions or maintenance activities as needed. To demonstrate compliance with Condition 7.1.2, the quantity of flare gas that shall be consumed in the flare shall not exceed 667,776 standard cubic feet per day with an annual rate not to exceed 243.7 MMscf/yr. Compliance with the flare gas throughput limit shall be demonstrated using a rolling 12-month total.

7.1.2. Maximum emissions from the flare (APCFLARE) shall not exceed the following limits:

Table 7.1.2. Emission Limits for APCFLARE

Pollutant	Maximum Hourly Rate (lb/hr)	Maximum Annual Rate (tpy)
VOC	18.48	2.43
NO_x	2.89	0.45
CO	15.62	2.11

7.1.3. The permittee shall operate and maintain the flare (APCFLARE) in a manner to minimize emissions. Such operation of the flare shall constitute the following:

a. The flare shall not exhibit any visible emissions, expect for periods not to exceed a total of 5 minutes during two consecutive hours.
[45 CSR §6-4.3.]

b. The pilot flame for the flare shall be lit at all times when any emission source at the permitted facility is operating that can generate effluent to be routed to the flare. The fuel source for the pilot light shall be either natural gas, flash tank off gas, or a combination of the two fuels.

c. The flare shall be constructed, operated, and maintained to achieve, at the minimum, 98% destruction efficiency for VOCs and volatile HAPs.

7.1.4. The effluent being routed to the flare shall not contain hydrogen sulfide in a concentration of greater than 50 grains per 100 cubic feet of carrier gas.
[45 CSR §10-5.1.]

7.1.5. The effluent and purge gas streams shall be routed to the flare through a closed vent system. The closed vent system as required in this condition shall meet the following:

a. The system shall be constructed of hard piping.

b. The system shall be constructed and maintained free of leaks. A leaking component is defined as a measured instrument reading greater than 500 ppm above background or by visual inspection.

c. Detected leaks shall be repaired as soon as practicable with the first attempt at repair within 5 calendar days after detecting the leak. Repair shall be completed no later than 15 calendar days after the leak is detected.

[45 CSR §13-5.11.]

7.1.6. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

7.2. Monitoring Requirements

7.2.1. The permittee shall determine the throughput of effluent to the flare on a monthly basis. Such records shall be maintained in accordance with Condition 3.4.1.

7.2.2. The presence of a flame the APCFLARE and identify any periods there was no flame present. Such records shall be maintained in accordance with Condition 3.4.1.

7.2.3. For the purpose of demonstrating proper operation of the APCFLARE, the permittee shall conduct a visible emission observation using Section 11 of Method 22 for one hour once every calendar quarter in which flare was in service. If during the first 30 minutes of the observation there were no visible emission observed, the permittee may stop the observation.

If at the end of the observation and visible emission were observed for more than 2 minutes, then the permittee shall follow manufacture's repair instruction, if available or best combustion engineering practice as outline in the unit inspection and maintenance plan. To return the flare to compliant operation, the permittee shall repeat the visible emission observation. Records of such monitoring and repair activities shall be maintained in accordance with Condition 3.4.1.

7.2.4. The permittee shall annually monitor and maintain records (calendar year) for each component of the closed vent system that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping; loose connections; liquid leaks; or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown. Records of such inspections shall be maintained in accordance with Condition 3.4.1
[45CSR§13-5.11.]

7.3. Testing Requirements

[Reserved]

7.4. Recordkeeping Requirements

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

8.0 Specific Requirements for the Hot Oil Heater

8.1 Limitations and Standards

8.1.1. Maximum emissions from the 3.35 MMBtu/hr Hot Oil Heater (EPOH-1) shall not exceed the following limits:

Table 8.1.1. Emission Limits for the Hot Oil Heater		
Pollutant	Maximum Hourly (lb/hr)	Maximum Annual (tpy)
NO_x	0.29	1.29
CO	0.25	1.08
VOC	0.02	0.07

8.1.2. To demonstrate compliance with Section 8.1.1, the quantity of natural gas that shall be consumed in the 3.35 MMBtu/hr Hot Oil Heater (EUOH-1) shall not exceed 3,350 cubic feet per hour and 29.35 x 10^6 cubic feet per year. The natural gas used as fuel for this emission unit shall not a total sulfur content of 1 grain per 100 cubic feet of gas.

8.1.3. Visible emissions from Emission Point EPOH-1shall be limited to ten (10) percent opacity or less based on a six (6) minute average. Compliance with this limit is satisfied by complying with Condition 8.1.2.
[45 CSR §2-3.1]

8.2. Monitoring Requirements

8.2.1. To demonstrate compliance with Conditions 8.1.1-8.1.3, the permittee shall maintain records of the amount of natural gas consumed in the Hot Oil Heater (EUOH-1) for each month of operation and maintain a 12-month rolling total. Such records shall be maintained in accordance with Condition 3.4.1.

9.0. Specific Requirements for Storage Tanks and Unloading Operations

9.1. Limitations and Standards

9.1.1. Vapors from the storage tanks (EPTK-1 – EPTK-12) shall captured by a vapor recovery unit (VRU) system while the any of the respective vessels are service, which include vessels that are empty but not degassed, and recompress the vapors back into a pipeline segment. The operational availability of the vapor recovery unit (VRU) system shall be 98% on a calendar year basis. No component of the close vent system of the VRU system shall exhibit any detectable emissions. Detectable emissions are defined as a concentration of 500 ppm or greater when using U.S.EPA Method 21. If the permittee is use an optical gas imaging camera, detectable emissions is defined as any visible leaks detected in accordance with U.S.
EPA Alternative OGI work practices.

If any leak or detectable emissions is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown.

9.1.2. The vapor recovery system must be installed and operating prior to start-up of the storage tanks (EPTK-1 – EPTK-12).

9.1.3. During unloading operations of EPTK-1 through EPTK-12 into trucker trucks, the permittee shall operate the natural gas liquids truck loading (EP-LOAD) operations shall be in accordance with the following requirements:

a. The maximum amount of liquids unloaded from all vessels shall not exceed 13.8 million gallons on a 12-month rolling total.

b. All trucks shall be loaded using the submerged-fill method;

c. The permittee shall, at all times trucks are being loaded with VOC-containing liquids, utilize a system of activated carbon canisters (carbon adsorption) to control captured VOC emissions from the tanker truck;

d. The capture system directing VOC emissions to the activated carbon canisters shall be installed, designed, and maintained so as to achieve a minimum capture efficiency of 70.00%; and

e. The activated carbon canisters shall be installed, designed, and maintained so as to achieve a minimum VOC collection efficiency of 95.00%.

9.1.4. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

9.2. Monitoring Requirements

9.2.1. For the purposes of demonstrating compliance with the maximum throughput limitations set forth in Condition 11.1.3., the permittee shall monitor and record monthly and rolling twelve month total of liquid throughput during truck loading operations.

9.2.3. For the purposes of demonstrating compliance with under 9.1.3.e, the permittee shall monitor the saturation levels of the activated carbon canisters and, according to manufacturer's recommendations, replace the activated carbon when it reaches a saturation level that is unable to sustain the minimum control percentage requirement.

9.2.3. For the purposes of demonstrating the close vent system of the VRU system, the permittee shall conduct monitoring of the vent system to include the tanks (EPTK-1 – EPTK-12). Such monitoring shall be conducted once every calendar year thereafter to ensure the system shall be free of leaks. Any detected leak shall be repaired in accordance with timing as stipulated in Condition 9.1.1. Records of the monitoring shall be maintained in accordance with Condition 3.4.1. and include monitoring/detection method used, instrument (if used), operator, calibration of the instrument (if required for the instrument), identified leaking component, date detected, and date of repair.
[45 CSR §13-5.11.]

9.3. Recordkeeping Requirements

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

9.3.3. The permittee shall record the cumulative number of hours of operation of the VRU compressor and hours any of the permittee storage vessels of this section was in service for each calendar year. Such records shall be maintained in accordance with Condition 3.4.1.

9.3.4. The permittee shall maintain records of all times the activated carbon was replaced in the carbon canisters pursuant to Condition 9.2.3. Such records shall be maintained in accordance with Condition 3.4.1.

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.

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

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

ENGINEERING EVALUATION/FACT SHEET

B ACKGROUND INFORMATION

Application No.:	R13-2831E
Plant ID No.:	051-00130
Applicant:	Appalachia Midstream Services, LLC (AMS)
Facility Name:	Miller Compressor Station
Location:	Miller
NAICS Code:	486210
Application Type:	Modification
Received Date:	April 1, 2015
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$2,000.00
Date Received:	July 22, 2015
Complete Date:	October 19, 2015
Due Date:	January 17, 2016
Applicant Ad Date:	April 10, 2015
Newspaper:	*Moundsville Daily Echo*
UTM's:	Easting: 532.48 km Northing: 4,396.73 km Zone: 17
Description:	This action is for the replacement of four compressor engines (EPCE-1, EPCE-9, EPCE-10, EPCE-11) with Caterpillar G3516B compressor engines, account for compressor blowdown emissions, and other miscellaneous emission sources due to undated gas analysis.

PROPOSED CHANGES TO THE FACILITY

AMS proposed to make the following changes to the Miller Station:

- Remove one (1) 1,380 hp Waukesha L5794 GSI compressor engine (EPCE-1)
- Replace three (3) (1,380 hp Caterpillar G3516B compressor engines (EPCE-9, EPCE-10, and EPCE-11) with like-kind engines (EPCE-12, EPCE-13, and EPCE-14).
- Add one (1) 1,380 hp Caterpillar G3516B compressor engine (EPCE-15)

- Add compressor blowdown emissions (EP-BD)
- Add on Capstone C600 Micro turbine (EPGEN-3)
- Revise facility emissions from miscellaneous sources (EPCE-2 –EPCE 11, EPDHY-1 – EPDHY_3,

DESCRIPTION OF PROCESS

The natural gas inlet stream from surrounding area wells enters the facility through an inlet suction separator prior to the gas being compressed. After the inlet gas passes through a compressor, it goes through the dehydration process before exiting the facility. Triethylene glycol (TEG) dehydration units are used to remove water from the gas. 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 boil off the water. The heat is supplied by a gas-fired reboiler that exhausts to the atmosphere. Overhead still column emissions will be controlled by an air-cooled condenser. The non-condensable gases from the still column emissions overheads will be routed to the reboiler and burned by a BTEX Buster with 95% destruction efficiency. Under normal operating circumstances, flash tank overhead vapors will be routed to the reboiler to be burned as fuel with 95% destruction efficiency. Any excess flash gas vapors not burned as fuel will be routed back to the inlet of the station for reprocessing. During upset conditions, excess flash gas may be routed to the flare and combusted with 98% destruction efficiency. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors.

Collected liquids are stabilized to remove volatile components before being stored in the ten (10) 400 bbl condensate storage tanks and transported off-site by truck. Overhead vapors generated in the stabilizer are compressed by an electric-driven flash gas compressor and recycled to the inlet gas stream. The hot oil heater provides hot oil to the stabilizer. Condensate dropout from liquids dumps, produced water and other pipeline fluids are stored in the two (2) 400-bbl pipeline fluids/water storage tanks and transported off-site via truck.

The generators provide electric power to the flash gas compressor, glycol pumps, hot oil pumps and other electrical equipment. Gas driven glycol pumps may also be used in place of the electric glycol pumps. The flare is used to combust gas during upsets and may also be used to combust flash tank off-gas and condensate stabilizer overhead gas as needed during flash gas compressor shutdown or maintenance. Emissions from fugitive components also occur.

SITE INSPECTION

On July 10, 2013, Mr. Steven Sobutka, engineer assigned to the Compliance and Enforcement Section of Northern Panhandle Regional Office, conducted routine inspection of the Miller Compressor Station. As a result of this inspection, Mr. Sobutka found the facility to be operating in compliance with Permit R13-2831D, which includes all applicable rules and regulations. No site inspection for this proposed application was deemed necessary.

ESTIMATE OF EMISSION BY REVIEWING ENGINEER

Emissions associated with this modification application consist of the combustion emissions from the engine replacements, revised the potential emissions from the compressor engines (EPCE-2 though 8), revised the emissions from glycol dehydration units with reboilers (EUDHY-1, EUDHY-2, EUDHY-3), one additional micro turbine, revised the emission potential from the hot oil heater (EPOH-1), revised potential emissions from equipment leaks and included blowdown emissions from compressors.

Emissions from the new engines were determined using engine manufactured emission data and the corresponding control efficiency from the oxidation catalysts manufacturer for carbon monoxide (CO), volatile organic compounds (VOCs) and formaldehyde. The engine manufacture's emissions data was used to determine the oxides of nitrogen (NO_x) emissions. The oxidation catalysts should have no effect on NO_x emissions from the engine and no control efficiency was applied for these NO_x emissions from the engines. Particulate matter (PM), which includes PM less than 10 micros (PM_{10}) and PM less than 2.5 micros ($PM_{2.5}$), were estimated from emission factors published in AP-42. The emission factor for condensable particulate matter (CPM) was included with total for each species of PM. AMS assumed a one grain of sulfur in the natural gas using in these engines and used a mass balance approach to determine sulfur dioxide (SO_2) emissions. The following table is a breakdown of potential emissions from one Caterpillar G3516B engine:

Table #1 Emissions from One Caterpillar G3516B Engine		
Pollutant	Hourly Rate (lb/hr)	Annual (tpy)
NO_x	1.52	6.66
CO	1.52	6.66
VOC	0.79	3.46
PM*	0.13	0.55
PM_{10}*	0.13	0.55
$PM_{2.5}$*	0.13	0.55
Formaldehyde	0.31	1.38
Carbon Dioxide Equivalent (CO_2e)	1,537.75	6,110.19

* Includes the condensable fraction of PM.

AMS is updating the emissions from each of the TEG dehydration units based on gas analysis on September 3, 2014. Each TEG dehydration unit is equipped with a primary electric glycol pump with a maximum capacity of 15 gallons per minute. In addition, each glycol dehydration unit has two (2) gas injection glycol pumps, each with a maximum capacity of 7.5 gallons per minute. Potential VOC emissions were based on GRI-GlyCalc results for the electric pumps since the emissions were higher than those using the backup gas pumps. Potential greenhouse gas (GHG) emissions were based on the GRI-GlyCalc results for the gas pumps since those emissions were higher than using the electric pump. Still vent vapors from the glycol dehydration units are controlled by an air-cooled condenser. Non-condensable gas from the still column overheads are routed to the reboiler and burned with 95% destruction efficiency. Under normal operating circumstances, flash tank overhead vapors are routed to the reboiler to be burned as fuel. When the heat energy requirement is satisfied for the reboiler, the excess vapors are routed to the inlet separator just upstream of the compressors for 100% control efficiency.

Table #2 – Emissions from the one dehydration						
	VOC		Benzene		Total HAPs	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Reboiler	0.01	0.02	0.01	0.01	0.01	0.01
BETX Buster	0.49	2.13	0.02	0.10	0.13	0.50
Total	0.50	2.15	0.03	0.11	0.14	0.51

The applicant determined the greenhouse gases potential of the dehydration unit which includes the contribution from combustion due to the reboiler, of 476.5 tons per year of carbon dioxide equivalent.

The applicant reviewed the emission potential from all sources at the Miller Station, which are included in the application. The following is a summary of the change to equipment and the revised emission potential on an annual basis.

Table #3 – Changes in Emissions			
Pollutant	Permit R13-2831E (tpy)	Proposed (tpy)	Net Change (tpy)
PM	8.34	8.83	0.49
NO_x	77.47	77.46	-0.01
CO	91.54	88.63	-2.91
SO_2	1.66	1.68	0.02
VOC	61.98	74.54	12.56
Total HAPs	14.85	15.15	0.30
Carbon Dioxide Equivalent	78,246.60	82,169.39	3,922.79

The main source of the increase of VOC and CO_2e emissions was that compressor blowdowns were included, which account for 65% of the VOCs and 50% CO_2e increases. EPA had changed the ratio of methane and nitrous oxide to carbon dioxide equivalences (Global Warming Potential) since the applicant last updated the emission potential for the Miller Station.

REGULATORY APPLICABLILITY

The Miller Compressor Station is a minor source with respect to the Title V Operating Permit Program (45CSR30). Thus, the facility is not required to obtain a Title V Operating Permit. The proposed changes do not affect the status with regards to 45 CSR 30.

The replacement engines are only subject to Subpart JJJJ to Part 60 and Subpart ZZZZ to Part 63. AMS proposes to install controls (oxidation catalyst) to meet the emission standard establish under Subpart JJJJJ. Because the facility is classified as an area source of HAPs, AMS satisfies the requirements of Subpart ZZZZ by complying with the requirements Subpart JJJJ. No other rules or regulations apply to the engines.

The replacement compressors are subject to a work practice requirement of Subpart OOOO to Part 60. This requires the rod packing to be replaced every 24,000 hours of operation.

The Miller Compressor Station is classified as a natural gas production facility. Under Subpart HH – National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facility of Part 63, the applicability of a major source in this subpart only considers the glycol dehydration unit(s) in determining if the affected source is a major source or area source of HAPs. The facility's dehydration unit is currently classified as a synthetic area source of HAPs, which means the facility has the potential to emit less than 10 tons of any single HAP and 25 tons of combined HAPs per year. Based on the HAP emission prediction with controls in Table 6, the glycol dehydration at the Miller Compressor Station will remain a synthetic area source of HAPs and is not classified as an affected source under Subpart HHH of Part 63.

AMS prepared and submitted a complete application, paid the filing fee, and published a Class I Legal ad in *Moundsville Daily Echo* on July 30, 2014, which is required under Rule 13 for a modification permit. The Miller Station remains classified as a minor source and subject to 45 CSR 22 as an "8D" source.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The replacement engines and other changes will not emit any new pollutants that aren't already being emitted by another emission source at the facility. Therefore, no information about the toxicity of the hazardous air pollutants (HAPs) is presented in this evaluation.

AIR QUALITY IMPACT ANALYSIS

The writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed modification does not meet the definition of a major source as defined in 45CSR14.

MONITORING OF OPERATIONS

Subparts JJJJ and OOOO establish testing and work practice requirements for the engines and compressor based on hours of operation. The current permit (R13-2831E) requires continuous monitoring of the inlet of the catalyst and quarterly analysis of the engine exhaust for NO_x and CO. Thus, the writer does not believe any additional monitoring is required.

For the new micro turbine, fuel usage is the best indicator of compliance with emission limits, which is currently required in the current permit.

CHANGE TO PERMIT R13-2831D

Permit R13-2831D set mass emission limits and a concentration limit pre Subpart JJJJ limits for the compressor engines. The issues with having both limits is that compliance testing only verifies compliance with the concentration limits of Subpart JJJJ, which does not require exhaust flow measurements to be taken and that the mass limits are significantly lower. Using F_d factor for natural gas of Method 19 to determine flow rate, the writer converted the hourly mass rate limits into concentration levels corrected to 15% oxygen level, which matches the same requirements of Subpart JJJJ. The following table is the summary of the data used and conversion of the limits.

Table #4 – Conversion of the Mass Limit to Concentration Limits				
Pollutant	Mass Limit (lb/hr)	Exhaust Flow[2] (scfh)	Concentration Limit* based on Mass Limit (ppmvd)	NSPS Limits* (ppmvd)
Waukesha L5794 Engine				
NO_x	1.48	92,617	37.76	160
CO	1.80	92,617	75.43	540
VOC[1]	0.22	92,617	5.86	86
Caterpillar G3516B Engine				
NO_x	1.52	89,543	40.11	160
CO	1.52	89,543	65.77	540
VOC	1.10	89,543	30.29	86

1 – Assumed to be propane.
2 – Used LHV of 1026 Btu/scf of the fuel; Maximum Fuel Rate; F_d factor of 8710 dscf/MMBtu
* - Corrected to 15% Oxygen

The permit will be configured with the mass limits with the converted concentration limits as indicators to be used as means to verify compliance with the mass limits when conducting Subpart JJJJ testing. Plus, the current permit requires quarterly measurements using a portable analyzer for CO, NO, NO_2, and O_2. Comparison of the portable analyzer reading and the converted concentration limits would be another means to verify compliance. The requirements for the engines and compressor will be integrated into Section 4.0 from Section 5.0.

Section 4.0 of R13-2831D mainly had requirements that were integrated into Section 3.0 for the facility-wide such as maintain a potential for HAPs below major source levels and Section 6.0 for the use of the controls on the still vent of the dehydration units.

The requirements for the Hot Oil heater were moved to Section 8.0. Besides updating the emission limits, the PM and SO_2 limits were omitted from the Emission Limit Table. PM and SO_2 emission are generally very low from emission units burning natural gas. 45 CSR §2-11.1 excludes units with a heat input of less than 10 MMBtu/hr from the PM weight emission standard and testing/monitoring requirements. The current permit had requirements for visible emission checks (Method 22 observations) once per month. This writer recommends omitting this visible emission by setting a fuel limit restriction which defines the maximum sulfur content.

The requirements for the three dehydration units were moved from Section 7.0. to Section 6.0. Permit R13-2831D separated the emission limits from the reboiler and BTEX Buster even though the emissions are released through the same stack. The writer recommends adding the two streams into one limit with an emphasis on establishing an acceptable standard for the closed vent system, which is no detectable leaks.

Other new requirements are establishing a maximum circulation rate of glycol and maximum outlet temperature of the BTEX Condenser, which were inputs of the GLYCalc analysis that predicted the VOC and HAP emission rates.

Section 7.0 will incorporate the APCFLARE from Section 8.0 of Permit R13-2831D. The main changes to this section was updating the emission limits, establishing an annual throughput limit that coincides with the annual emission limits, and omitting non-applicable flare design specific requirements that were satisfied in the application. Permit R13-2831D required a monthly visual emission check. The writer recommends omitting it and setting verification of proper operation of the flare by conducting quarterly visible emission checks using Method 22.

Section 8 and 11 of Permit R13-2831D were combined into one section. The only change for the tank loadout is establishing a standard for the closed vent system that is used to control emissions from the storage tanks and truck loading operations. For all of the closed vent systems (dehydration units, storage tanks, loading operations), the permittee will be required to monitor the closed vent system through a leak detection and repair program (LDAR). The facility was originally constructed with a JT Skid which made the facility subject to the requirements of Subpart KKK of Part 60, which refers to LDAR requirements of Subpart VV of Part 60. Subpart VV required monitoring of closed vent systems once per year using audio-visual-olfactory (AVO) inspections methods. Since the JT skid has been removed, Subpart VV is no longer applicable. Thus, the rule citations for the LDAR will be removed and replaced with the 45 CSR §13-5.11.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates the proposed modification of the facility will meet all the requirements of the applicable rules and regulations when operated in accordance with the permit application. Therefore, the writer recommends granting Appalachia Midstream Services, LLC a Rule 13 modification permit for their Miller Compressor Station located near Banner, WV.

Edward S. Andrews, P.E.
Engineer

November 6, 2015
Date

Andrews, Edward S

From:	Adkins, Sandra K
Sent:	Friday, December 18, 2015 2:47 PM
To:	Wheeler, Cathy L
Cc:	Andrews, Edward S
Subject:	DAQ Public Notice

Please see below the Public Notice for Draft Permit R13-2831E for Appalachia Midstream Services, LLC's Miller Compressor Station located in Marshall County.

The notice will be published in the *Moundsville Daily Echo* on Tuesday, December 22, 2015, and the thirty day public comment period will end on Thursday, January 21, 2016.

AIR QUALITY PERMIT NOTICE

Entire Document
NON-CONFIDENTIAL

Notice of Intent to Approve

On April 1, 2015, Appalachia Midstream Services, LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to modify a compressor station facility located on County Road 1/22 (Johnson Ridge), near Bannen, Marshall County, WV at latitude 39.7216 and longitude -80.6209. 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 Permit R13-2831E.

The following changes in potential emissions will be authorized by this permit action: Particulate Matter less than 10 microns, 0.49 tons per year (TPY); Particulate Matter, 0.49 TPY; Sulfur Dioxide, 0.02 TPY; Oxides of Nitrogen, decrease (-) 0.01 TPY; Carbon Monoxide, -2.91 TPY; Volatile Organic Compounds, 12.56 TPY; Total Hazardous Air Pollutants, 0.30; and Carbon Dioxide Equivalent, 3,922.79 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on Thursday, January 21, 2016. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed modification 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.

Edward S. Andrews
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
Telephone: 304/926-0499, ext. 1214

ID # 51-130
Reg R13-2831E
Company AMS
Facility Miller C.S. Initials [illegible]

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

Andrews, Edward S

From: Adkins, Sandra K
Sent: Friday, December 18, 2015 2:47 PM
To: wentworth.paul@epa.gov; bradley.megan@epa.gov; kristin.ikard@williams.com
Cc: Durham, William F; McKeone, Beverly D; McCumbers, Carrie; Hammonds, Stephanie E; Rice, Jennifer L; Andrews, Edward S; Taylor, Danielle R; Carey, Angela E
Subject: WV Draft Permit R13-2831E for Appalachia Midstream Services, LLC; Miller Station
Attachments: 2831E.pdf; Eval2831E.pdf; notice.pdf

Please find attached the Draft Permit R13-2831E, Engineering Evaluation, and Public Notice for Appalachia Midstream Services, LLC's Miller Compressor Station located in Marshall County.

The notice will be published in the *Moundsville Daily Echo* on Tuesday, December 22, 2015, and the thirty day public comment period will end on Thursday, January 21, 2016.

Should you have any questions or comments, please contact the permit writer, Ed Andrews, at 304 926-0499 x1214.

Andrews, Edward S

From: Andrews, Edward S
Sent: Friday, December 18, 2015 2:44 PM
To: Adkins, Sandra K; McKeone, Beverly D; Rice, Jennifer L
Subject: R13-2831E has been approved for public comment
Attachments: 051-00130_EVAL_R132831E.docx; 051-00130_Notice_R13-2831E_draft.doc; 051-00130_PERM_R13-2831Edraft (2).docx; 051-00130_R13table_R13-2831E.wpd

Sandra: Bev has approved R13-2831E for public comment. I have attached the files you should need.
I will be bring over the actual file this afternoon.

Should you have any questions, please contact me.
Thanks
Ed

Andrews, Edward S

From: Adkins, Sandra K
Sent: Friday, December 18, 2015 2:43 PM
To: Charles Walton
Cc: Andrews, Edward S
Subject: FW: Publication of Class I Legal Ad for the WV Division of Air Quality

Thank you!

From: Charles Walton [mailto:mdsvecho@gmail.com]
Sent: Friday, December 18, 2015 2:42 PM
To: Adkins, Sandra K <Sandra.K.Adkins@wv.gov>
Subject: Re: Publication of Class I Legal Ad for the WV Division of Air Quality

received

On Fri, Dec 18, 2015 at 1:59 PM, Adkins, Sandra K <Sandra.K.Adkins@wv.gov> wrote:

Please publish the information below as a Class I legal advertisement (one time only) in the Tuesday, December 22, 2015, 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

AIR QUALITY PERMIT NOTICE

Notice of Intent to Approve

On April 1, 2015, Appalachia Midstream Services, LLC applied to the WV Department of Environmental Protection, Division of Air Quality (DAQ) for a permit to modify a compressor station facility located on County Road 1/22 (Johnson Ridge), near Bannen, Marshall County, WV at latitude 39.7216 and longitude -80.6209. 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 Permit R13-2831E.

The following changes in potential emissions will be authorized by this permit action: Particulate Matter less than 10 microns, 0.49 tons per year (TPY); Particulate Matter, 0.49 TPY; Sulfur Dioxide, 0.02 TPY; Oxides of Nitrogen, decrease (-) 0.01 TPY; Carbon Monoxide, -2.91 TPY; Volatile Organic Compounds, 12.56 TPY; Total Hazardous Air Pollutants, 0.30; and Carbon Dioxide Equivalent, 3,922.79 TPY.

Written comments or requests for a public meeting must be received by the DAQ before 5:00 p.m. on Thursday, January 21, 2016. A public meeting may be held if the Director of the DAQ determines that significant public interest has been expressed, in writing, or when the Director deems it appropriate.

The purpose of the DAQ's permitting process is to make a preliminary determination if the proposed modification 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.

Edward S. Andrews

WV Department of Environmental Protection

Division of Air Quality

601 57th Street, SE

Charleston, WV 25304

Telephone: 304/926-0499, ext. 1214

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

Andrews, Edward S

From:	Andrews, Edward S
Sent:	Friday, December 18, 2015 2:22 PM
To:	Adkins, Sandra K; McKeone, Beverly D; Rice, Jennifer L
Subject:	R13-2831E has been approved for public comment for Appalachia Midstream Services - Miller Compressor Station
Attachments:	051-00130_EVAL_R132831E.docx; 051-00130_PERM_R13-2831Edraft (2).docx; 051-00130_Notice_R13-2831E_draft.doc; 051-00130_R13table_R13-2831E.wpd

Sandra: Bev has approved R13-2831E for public comment. I have attached are the files you should need to get this one out to notice.

I will bring over the file later this afternoon.

Should you have any questions, please contact me.

Thanks,
Ed

Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Friday, November 20, 2015 10:44 AM
To: Andrews, Edward S
Subject: RE: AMS - Miller Compressor Station Predraft Permit R13-2831E

Sorry it took so long to get back to you on this.

Those Emissions IDs look good.

Let me know if there is anything else.

Thanks Ed!

Kijun

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Thursday, November 12, 2015 7:41 AM
To: Hong, Kijun <Kijun.Hong@williams.com>
Subject: RE: AMS - Miller Compressor Station Predraft Permit R13-2831E

Only just how I re-number the new replacement engines in Table 1.0.

Ed

From: Hong, Kijun [mailto:Kijun.Hong@williams.com]
Sent: Thursday, November 12, 2015 9:39 AM
To: Andrews, Edward S
Subject: RE: AMS - Miller Compressor Station Predraft Permit R13-2831E

Thanks Ed.

Is this something you would like us to comment on? I know we've gone through a few rounds of comments previously.

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Tuesday, November 10, 2015 7:34 AM
To: Hong, Kijun <Kijun.Hong@williams.com>
Subject: AMS - Miller Compressor Station Predraft Permit R13-2831E

Kijun:

Here is the version of the draft that I have forward to my supervisor to review. One new thing that has come up lately is that our enforcement section request that new emission sources (i.e. engines) be identified with a new Emission ID in the permit. This applies to a source that has conducted a performance test(s). So, I adjusted the numbering for the new replacements engines EUCE-12 through EUCE-15 with corresponding emission points of EUCE-12 through EUCE-15.

I will follow up with you once my supervisor has reviewed my findings and recommendations.

Should you have any questions, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

Andrews, Edward S

From: Andrews, Edward S
Sent: Wednesday, November 18, 2015 7:39 AM
To: Ikard, Kristin
Subject: RE: Predraft for AMS Miller Station R13-2831E

Ms. Ikard:

At this time with regards to the Miller C.S. application, my findings and recommendations are being review by my supervisor.

Should you have any further questions about your application, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

From: Ikard, Kristin [mailto:Kristin.Ikard@williams.com]
Sent: Tuesday, November 17, 2015 5:44 PM
To: Andrews, Edward S
Subject: RE: Predraft for AMS Miller Station R13-2831E

Mr. Andrews,

I have taken this project over from Kijun as he has transferred to another position at Williams. Is there anything you need from me to complete this permit?

Thanks,
Kristin

Kristin Ikard | Williams | Environmental Specialist IV – Air Permitting | Environmental Services COE
Office: 405-727-1443 | Cell: 405-826-0772 | 525 Central Park Dr., Oklahoma City, OK 73105

From: Hong, Kijun
Sent: Monday, October 19, 2015 2:49 PM
To: 'Andrews, Edward S' <Edward.S.Andrews@wv.gov>
Cc: Ikard, Kristin <kristin.ikard@williams.com>; Hill, Jaron <Jaron.Hill@williams.com>
Subject: RE: Predraft for AMS Miller Station R13-2831E

Mr. Andrews,
Per our phone conversation today, we would like to request a 3rd Capstone C600 Microturbine Generator be included in the permit as EPGEN-3.

Please allow for full time operation as represented by the other (2) units.

The manufacture spec sheet has been included which documents the NOx emission factor of 0.14 g/hp-hr. CO, VOC, and PM emissions were calculated using AP-42 factors. SO2 emissions were calculated using mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel.

Please let me know if there are any questions or if there is anything else we can provide.

Thank You,
Kijun

My e-mail address has changed to Kijun.Hong@Williams.com.
Please ensure you have my correct email contact information in your records.

Kijun Hong | Williams | Specialist - Air | EHS
Office: 405-727-1245 | Cell: 405-694-7815 | Fax: 405-727-3245
525 Central Park Drive, Ste. 1005 | Oklahoma City, OK 73105-1723

From: Hong, Kijun
Sent: Monday, October 19, 2015 11:47 AM
To: 'Andrews, Edward S' <Edward.S.Andrews@wv.gov>
Subject: RE: Predraft for AMS Miller Station R13-2831E

Hi Mr. Andrews,
I wanted to follow up on this and see if there was anything else you needed from our end.

Do you have an estimated time frame as to when the permit would be issued?

From: Hong, Kijun
Sent: Friday, July 10, 2015 11:41 AM
To: 'Andrews, Edward S' <Edward.S.Andrews@wv.gov>
Subject: RE: Predraft for AMS Miller Station R13-2831E

Mr. Andrews,
Please find attached our comments on the draft permit. Thank you for allowing us the opportunity to review and submit our remarks.

Please let me know if you have any questions or if there is anything else we can provide.

Thanks Again!
Kijun

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Friday, June 26, 2015 12:26 PM
To: Hong, Kijun
Subject: Predraft for AMS Miller Station R13-2831E

Kjiun: I made some fairly significant changes to the permit. I have to re-do my concentration numbers for the engines so that you can review them as well. One of formulas I used got cut off.

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Sincerely,

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West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

Andrews, Edward S

From:	Andrews, Edward S
Sent:	Thursday, November 12, 2015 9:41 AM
To:	Hong, Kijun
Subject:	RE: AMS - Miller Compressor Station Predraft Permit R13-2831E

Only just how I re-number the new replacement engines in Table 1.0.

Ed

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From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Tuesday, November 10, 2015 7:34 AM
To: Hong, Kijun <Kijun.Hong@williams.com>
Subject: AMS - Miller Compressor Station Predraft Permit R13-2831E

Kijun:

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Andrews, Edward S

From: Andrews, Edward S
Sent: Tuesday, November 10, 2015 9:34 AM
To: Hong, Kijun (Kijun.Hong@williams.com)
Subject: AMS - Miller Compressor Station Predraft Permit R13-2831E
Attachments: 051-00130_PERM_R13-2831Epre-draft.docx

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Andrews, Edward S

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Mr. Andrews,
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Thanks Again!
Kijun

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Friday, June 26, 2015 12:26 PM
To: Hong, Kijun
Subject: Predraft for AMS Miller Station R13-2831E

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Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
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601 57th Street, SE
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304.926.0499 ext. 1214

Andrews, Edward S

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Subject: RE: Predraft for AMS Miller Station R13-2831E
Attachments: 051-00130_PERM_R13-2831E_COMMETNS.docx

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Please find attached our comments on the draft permit. Thank you for allowing us the opportunity to review and submit our remarks.

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Thanks Again!
Kijun

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Division of Air Quality
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Charleston, WV 25304
304.926.0499 ext. 1214

Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Friday, June 26, 2015 2:06 PM
To: Andrews, Edward S
Subject: RE: Predraft for AMS Miller Station R13-2831E

Thank you Sir!

We will take a look and get back to you shortly.

Have a great weekend!
Kijun

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Friday, June 26, 2015 12:26 PM
To: Hong, Kijun
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Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

Andrews, Edward S

From: Andrews, Edward S
Sent: Thursday, June 11, 2015 11:07 AM
To: Hong, Kijun
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E

Mr. Hong:

If it is available, could you send the full ProMax report (either Word or Excel file format is file). If not, could you identify the source (process) of cross-flow sheet connectors feed into the sheet your provided and gas analysis inputted into the simulation to predict that corresponding stream (if applicable). (XFS5, XFS9, XFS11, XFS12, XFS13, XFS16)

Thanks,
Ed

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

From: Hong, Kijun [mailto:Kijun.Hong@williams.com]
Sent: Wednesday, May 13, 2015 3:15 PM
To: Andrews, Edward S
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E

Mr. Andrews, please see below for the rest of the information requested.

Thank You.
Kijun

From: Hong, Kijun
Sent: Thursday, May 07, 2015 10:04 AM
To: 'Andrews, Edward S'
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E

Hi Mr. Andrews,
I am still working on getting some of this info but here is what I have so far. Please see responses below.

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Tuesday, May 05, 2015 12:46 PM
To: Hong, Kijun
Subject: Appalachia Miller Compressor Station Application R13-2831E

Mr. Hong:

I just have a few information requests and several questions concern the Miller.

The application implies that EUCE-1, EUCE-9 through EUCE-11 has already been removed. Is there a forecasted installation date on the new compressor engines? **We do not have a forecasted install date as of yet.**

For EUCE-7 & 8, are the changes to these engines limited to updating the emissions (CO, VOC, PM10, CPM, SO2)? **Yes, this was due to using a more recent fuel analysis. I believe Formaldehyde and total HAPs changed as well.**

Are all of the Caterpillar compressor engines equipped with the EMIT ELH-4200-1616F-4CEE-242 Catalyst? **All the catalysts are different. The listed emit catalyst may or may not be the element that is used. All catalysts will meet or exceed the reductions of the above Emit element.**

For the emission point for the compressor blowdowns, is this emission point an actual vent that all compressor vent to or fugitive emissions within the compressor building? **Each unit has its own blowdown stack.**

Could you provide the ProMax Report that was used to determine the flash emissions from the Storage Tanks? **Attached**

Could you provide the manufacturer's data sheet on the flare, carbon canister adsorption, and the BTEX buster? **Attached**

Were all of the stabilized condensate and pipeline fluids tanks placed into service prior to August 23, 2011? **Yes all were set and started prior to 8-23-11**

Are there any pneumatic controllers located at the facility that was installed after August 23, 2011? **Station uses air to drive pneumatics.**

Should you have any questions about this request or your application, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Thursday, May 07, 2015 11:04 AM
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Should you have any questions about this request or your application, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer

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Andrews, Edward S

From: Andrews, Edward S
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Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Tuesday, April 28, 2015 12:55 PM
To: Andrews, Edward S
Subject: RE: Miller Public Notice Affidavit
Attachments: MILLER%20SITE-SITE%20OVERVIEW.PDF

Here is the updated plot plan for Miller.

Please let me know if there is anything else you need.

Kijun

From: Hong, Kijun
Sent: Monday, April 20, 2015 4:40 PM
To: 'Andrews, Edward S'
Subject: Miller Public Notice Affidavit

Hello Mr. Andrews,
The affidavit of public notice for the Miller R13 application was put in the mail today.

I have attached a scan of the documents.

Please let me know if there is anything else you need regarding this application.

Thank You!
Kijun

My e-mail address has changed to Kijun.Hong@Williams.com.
Please ensure you have my correct email contact information in your records.

Kijun Hong | Williams | Specialist - Air | EHS
Office: 405-727-1245 | Cell: 405-694-7815 | Fax: 405-727-3245
525 Central Park Drive, Ste. 1005 | Oklahoma City, OK 73105-1723

West Virginia Department of Environmental Protection

Earl Ray Tomblin
Governor

Division of Air Quality

Randy C. Huffman
Cabinet Secretary

Permit to Modify

R13-2831E

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, LLC
Miller Compressor Station
051-00130

William F. Durham
Director

Issued: DRAFT

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Revision 3/29/05~~Revision 3/29/05~~

This permit will supercede and replace Permit R13-2831D.

Facility Location:	County Road 1/22 (Johnson Hill) Bannen, Marshall County, West Virginia
Mailing Address:	P.O. Box 54368 Oklahoma City, OK 73154-1368
Facility Description:	Natural Gas Production Compressor Station
NAICS Codes:	211111
UTM Coordinates:	532.48 km Easting • 4,396.73 km Northing • Zone 17
Permit Type:	Modification
Description of Change:	This action is for the replacement of four compressor engines (EPCE-1, EPCE-9, EPCE-10, EPCE-11) with Caterpillar G3516B compressor engines, account for compressor blowdown emissions, and other miscellaneous emission sources due to undated gas analysis.

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.

Field Code Changed

Table of Contents

1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
EUCE-2	EPCE-2	Waukesha L5794 Compressor Engine Engine SN: C-17569/1 Unit ID: MC3573	2010	1,380 hp	NSCR
EUCE-3	EPCE-3	Waukesha L5794 Compressor Engine Engine SN: C-17563/1 Unit ID: MC3574	2010	1,380 hp	NSCR
EUCE-4	EPCE-4	Waukesha L5794 Compressor Engine Engine SN: C-17315/1 Unit ID: MC3575	2010	1,380 hp	NSCR
EUCE-5	EPCE-5	Waukesha L5794 Compressor Engine Engine SN: C17771/1 Unit ID: MC3578	2010	1,380 hp	NSCR
EUCE-6	EPCE-6	Waukesha L5794 Compressor Engine Engine SN: C17723/1 Unit ID: MC3780	2010	1,380 hp	NSCR
EUCE-7	EPCE-7	Caterpillar G3516B Compressor Engine Engine SN: JEF01452 Unit ID: MC4111 Compressor SN: F-37820 Compressor DOM: 1/6/2012	2012	1,380 hp	Oxid. Cat.
EUCE-8	EPCE-8	Caterpillar G3516B Compressor Engine Engine SN: JEF01434 Unit ID: MC4109 Compressor SN: F-37171 Compressor DOM: 12/23/2011	2012	1,380 hp	Oxid. Cat.
EUCE-9	EPCE-9	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-10	EPCE-10	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-11	EPCE-11	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EUCE-12	EPCE-12	Caterpillar G3516B Compressor Engine	2015	1,380 hp	Oxid. Cat.
EP-BD		Compressors Blowdown Vent	2010	N/A	N/A
EUGEN-1	EPGEN-1	Capstone C600 Generator	2010	805 hp	None
EUGEN-2	EPGEN-2	Backup Capstone C600 Generator	2010	805 hp	None
EUDHY-1	EPSTL-1	TEG Glycol Dehydration Unit Still Vent	2010	53.8 MMscfd	APCCOND-1
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-1	Glycol Reboiler		1.0 mmBtu/hr	None
EUDHY-2	EPSTL-2	Glycol Dehydration Unit Still Vent	2010	53.8 MMscfd	APCCOND-2
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-2	Glycol Reboiler		1.0 mmBtu/hr	None
EUDHY-3	EPSTL-3	Glycol Dehydration Unit Still Vent	2012	53.8 MMscfd	APCCOND-3
		Flash Tank		N/A	Reboiler/Recompression/APC Flare
	EPRBL-3	Glycol Reboiler		1.0 mmBtu/hr	None
EUTK-1	EPTK-1	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-2	EPTK-2	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-3	EPTK-3	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-4	EPTK-4	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-5	EPTK-5	Stabilized Condensate Storage Tank	2010	400 bbl	VRU

Comment [RD1]: SN C-17723/1 Unit AC3780

Comment [RD2]: SN C17563/1 Unit AC3574

Comment [RD3]: SN C-17570/1 Unit AC 3572

Comment [RD4]:

Comment [RD5]: SN C-17569/1 Unit 3573

Comment [RD6]: Engine SN JEF01492 Unit 4113
Compressor SN F-37392 DOM 4-1-2014

Comment [RD7]: Engine SN JEF01462 Unit 4112
Compressor SN F-37820 DOM 1-6-2012

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed	Design Capacity	Control Device
EUTK-6	EPTK-6	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-7	EPTK-7	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-8	EPTK-8	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-9	EPTK-9	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-10	EPTK-10	Stabilized Condensate Storage Tank	2010	400 bbl	VRU
EUTK-11	EPTK-11	Pipeline Fluids/Water Storage Tank	2010	400 bbl	VRU
EUTK-12	EPTK-12	Pipeline Fluids/Water Storage Tank	2010	400 bbl	VRU
EULOR	EPLOR	Liquids Loadout Rack	2010	NA	Closed System to ACC
EUOH-1	EPOH-1	Hot Oil Heater	2010	3.35 MMBTU/hr	None
APCFLARE	APCFLARE	Pressure Assisted Flare	2010	65 scfh (pilot) 6154,116 scfh	None

NSCR – Non-selective catalytic reduction
Oxid Cat. - Oxidation catalyst
VRU – Vapor Recovery Unit
ACC - Activated Carbon Canister

Comment [RD8]: Should be labeled truck load. We do not have a Loadout rack. Emission unit was labeled correctly in previous permit. System is NOT a closed system as represented in this permit application. Carbon canisters are the control device.

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	**NO_X**	Nitrogen Oxides
CBI	Confidential Business Information	**NSPS**	New Source Performance Standards
CEM	Continuous Emission Monitor	**PM**	Particulate Matter
CES	Certified Emission Statement	**$PM_{2.5}$**	Particulate Matter less than 2.5 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	**Ppm_V or ppm_V**	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 Act 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 supersedes and replaces previously issued Permit R13-2831D. 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 R13-2831, R13-2831A, R13-2831B, R13-2831C, R13-2831D, R13-2831E, 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; and

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.]

3.1.7. 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.

3.2. Monitoring Requirements

3.2.1. For the purpose of demonstrating compliance with emission sources subject to 45 CSR §10-5.1, the permittee shall conduct gas sampling at a point that is representative of the incoming natural gas to the facility and analyzing the sample to determine the hydrogen sulfide content of the sample. At the minimum, such sampling and analysis shall be conducted once per year. Once per

year shall mean between 11 months to 13 months from the previous gas sampling. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. of this permit.
[45 CSR §10-8.3.a.]

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.*]

3.4.3. The permittee shall maintained documentation of the VOCs and HAPs in the fuel gas consumed in the permitted emission units at the facility. Such documentation may either be gas analysis of the fuel gas or predicted analysis that used acceptable process simulator with the actual facility operating parameters and most recent gas analysis of the incoming wet gas to the facility. Such records shall be maintained in accordance with Condition 3.4.1.

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:	**If to the US EPA:**
Director	Associate Director
WVDEP	Office of Air Enforcement and Compliance Assistance
Division of Air Quality	(3AP20)
601 57th Street	U.S. Environmental Protection Agency
Charleston, WV 25304-2345	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.

3.5.5. **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. Specific Requirements for the Compressor Engines and Associated Compressors

4.1. Limitations and Standards

4.1.1. The following conditions and requirements are specific to the engines identified as EUCE-2, EUCE-3, EUCE-4, EUCE-5, and EUCE-6 :

a. Emissions from each engine shall not exceed the following:

i. NO_x emissions from the engine shall not exceed 160 ppmvd at 15 percent O_2. The mass rate of NO_x emissions from each engine shall not exceed 1.48 pounds per hour and 6.48 tpy.

ii. CO emissions from engine shall not exceed 540 ppmvd at 15 percent O_2. The mass rate of CO emissions from each engine shall not exceed 1.81 pounds per hour and 7.92 tpy.

iii. VOC emissions from the engine shall not exceed 86 ppmvd at 15 percent O_2. Formaldehyde is excluded from this VOC limit. The mass rate of VOC emissions shall not exceed 0.22 pounds per hour and 0.95 tpy.

[40 CFR §60.4333(e) & Table 1 to Subpart JJJJ of Part 60—NO_X, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP]

Comment [RD9]: Please remove the JJJJ limits. The lb/hr limits are much more stringent and are what is represented in the permit application. VOC limits include VOC and formaldehyde emissions. The limits should be 0.14 lb/hr and 0.62 tons/year.

iv. Formaldehyde emissions from each engine shall not exceed 0.08 pounds per hour and 0.33 tpy.

b. Each engine shall be equipped with non-selective catalytic reduction (NSCR) air pollution control device.

c. Each engine shall be equipped with air to fuel controller. 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.

[40 CFR §60.4243(g)]

d. Each engine shall be equipped with a non-resettable hour meter.

e. Compliance with the mass emission limits in item a of this condition is satisfied by Compiling with Condition 4.1.4. and not exceeding the following concentrations during performance testing:

i. NO_x concentration of 37.3 ppmvd at 15% O_2.

ii. CO concentration of 74.83 ppmvd at 15% O_2.

iii. VOC concentration of 5.78 ppmvd at 15% O_2.

Comment [RD10]: Please remove this section.

4.1.2. The following conditions and requirements are specific to the internal combustion engines identified as EUCE-7, EUCE-8, EUCE-9, EUCE-10, EUCE-11, and EUCE-12 and compressors driven by such engines:

a. Emissions from the engine shall not exceed the following:

i. NO_x emissions from the engine shall not exceed 82 ppmvd at 15 percent O_2. The mass rate of NO_x emissions shall not exceed 1.52 pounds per hour and 6.66 tpy.

ii. CO emissions from engine shall not exceed 270 ppmvd at 15 percent O_2. The mass rate of CO emissions shall not exceed 1.52 pounds per hour and 6.66 tpy

iii. VOC emissions from the engine shall not exceed 86 ppmvd at 15 percent O_2. Formaldehyde is excluded from this VOC limit. The mass rate of VOC emissions shall not exceed 1.10 pounds per hour and 4.84 tpy.
[40 CFR §60.4333(e) & Table 1 to Subpart JJJJ of Part 60—NO_X, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP]

iv. Formaldehyde emissions from each engine shall not exceed 0.16 pounds per hour and 0.69 tpy.

Comment [RD11]: Please remove the JJJJ limits. The lb/hr limits are much more stringent and are what is represented in the permit application. VOC limits include VOC and formaldehyde emissions. The limits should be 0.79 lb/hr and 3.46 tons/year

Comment [RD12]: Formaldehyde emissions should be 0.31 lb/hr and 1.38 tons/yr per permit application

b. Each engine shall be equipped with oxidation catalytic air pollution control device.

c. Each engine shall be equipped with a non-resettable hour meter.

d. Compliance with the mass emission limits in item a of this condition is satisfied by Compiling with item c. and not exceeding the following concentrations during performance testing.

i. NO_x concentration of 37.3 ppmvd at 15% O_2.

ii. CO concentration of 74.83 ppmvd at 15% O_2.

iii. VOC concentration of 5.78 ppmvd at 15% O_2.

Comment [RD13]: Remove section emission limits aren't representative of these Cat 3516 lean burn engines.

e. The rod packing for each compressor shall be replace once every 26,000 hours of operation
[40 CFR §60.5385(a)(1)]

4.1.3. The permittee shall only operate these engines using fuel gas generator by the condensate stabilizer expect during emergency operation at which the permittee may operate them using propane for a maximum of 100 hours per year.
[40CFR§60.4243(e)]

Comment [RD14]: Field gas from the fuel gas skid is the only fuel that will be used in all 11 engines.

4.1.4. Requirements for Use of Catalytic Reduction Devices

a. Rich-burn natural gas compressor engines (EPCE-1 - EPCE-6) equipped with non-selective catalytic reduction (NSCR) air pollution control devices shall be fitted with a closed-loop, automatic air/fuel ratio controller to ensure emissions of regulated pollutants do not exceed the potential to emit for any engine/NSCR combination under varying load. The closed-loop, automatic air/fuel ratio controller shall control a fuel metering valve to ensure a fuel-rich mixture and a resultant exhaust oxygen content of less than or equal to 0.5%.
[40CFR§60.4243(g)]

Comment [RD15]: Rich Burn

Comment [RD16]: Should be EPCE 2 – EPCE 6

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.

Comment [RD17]: EPCE 2 – EPCE 11

c. At least once per calendar quarter, the permittee shall conduct portable analyzer strip checks of Nitrogen Oxides (NO_x and Carbon Monoxide (CO) emissions from the engines when operating under representative conditions for that period to ensure proper operation of the catalytic reduction devices. The portable analyzer strip checks shall be conducted using the following procedure:

1. 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.

2. The emissions check should produce at least one test strip of concentration data for each of 0_2 NO, $N0_2$ and CO. The analyzer should be run for 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.

3. 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.

d. Upon request by the Director or his/her duly authorized representative, testing shall be conducted using a portable analyzer in accordance with the MidCon Compression portable analyzer protocol submitted with Permit Application R13-2831B or other approved methods. Such controls shall ensure proper and efficient operation of the engine and air pollution control devices.

e. During any calendar quarter when a performance test is required under Section 4.3 of this permit, those test results will satisfy the requirements of item c of this condition in lieu of a portable analyzer strip check.

4.1.5. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

4.2. Monitoring Requirements

4.2.1. The permittee shall maintain a maintenance plan 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.
[40 CFR §60.4243(b)(2)(ii)]

4.2.2. The permittee shall monitor and record the hours of operation through the non-resettable hour meter for each engine on a monthly basis and record the number of hours the engine operated using propane. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.
[40CFR§60.4245(b)]

4.3. Testing Requirements

4.3.1. The permittee must conduct an initial performance testing for engines EUCE-9, EUCE-10, EUCE-11, and EUCE-12 within one year of initial startup of each corresponding engine. Such testing shall be conducted in accordance with Condition 4.3.1.
[40 CFR §60.4243(a)(2)(iii)]

4.3.2. The permittee must conduct performance testing on each engine every 8,760 hours of operation or once every three years, whichever comes first. Such testing shall be conducted in accordance with the following the procedures and Condition 3.3.1.

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 Subpart JJJJ.
[40CFR§60.4244(a)]

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

c. Permittee 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. If the permittee 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.

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

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.

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

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.

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

Where:
C_{Peq}= Concentration of compound i in mg of propane equivalent per DSCM.
[40CFR§60.4244(g)]

Records of such testing shall be maintained in accordance with Condition 3.4.1.
[40CFR§60.4243(b)]

4.4. Recordkeeping Requirements

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

a. The date, place as defined in this permit, and time of sampling or measurements;

b. The date(s) analyses were performed;

c. The company or entity that performed the analyses;

d. The analytical techniques or methods used;

e. The results of the analyses; and

f. The operating conditions existing at the time of sampling or measurement.

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

4.4.4. For each compressor connected to Engines EUCE-7, EUCE-8, EUCE-9, EUCE-10, EUCE-11, and EUCE-12, the permittee shall maintain records of the following in accordance with Condition 3.4.1.

i. Record the cumulative number of hours of operation since initial startup or the previous replacement of the reciprocating compressor rod packing, whichever is later

ii. Record of the date of the recent replacement of the rod packing.
[40 CFR §60.5385(c)(3)]

4.4.5. The permittee shall maintain records of the monitoring as requirement in Condition 4.1.4. for each engine in accordance with Condition 3.4.1.

4.5. Reporting Requirements

4.5.1. The permittee shall submit a notification to the Director of the initial start-up date, engine serial number, and compressor serial number for Engines EUCE-9, EUCE-10, EUCE-11, and EUCE-12. Such notice must be submitted within 15 days after the actual date of start-up for the affected source. This notification supersedes the notification requirements of Condition 2.18.
[40 CFR §60.4245(c) & 40 CFR §60.7(a)(3)]

Comment [KH18]: Please remove. as 40CFR Part 60 Table 3 exempts these sources from 40 CFR 60.7(a)(3) and 40 CFR 60.4245(c) requires notice as required by 40 CFR 60.7(a)(1) which is the 30 day construction notice

We would like to keep this permit consistent with all of our other R13 permits by requiring the 30 day start up notice as listed in Condition 2.18

4.5.2. The permittee shall submit annual compliance reports of compliance that indicates compliance with Condition 4.1.2.e. and 40 CFR §60.5385(a)(1) from the compressors connected to Engines EUCE-7, EUCE-8, EUCE-9, EUCE-10, EUCE-11, and EUCE-12 to the Director and Administrator in accordance with Conditions 3.5.1. and 3.5.3. The reporting period of such reports shall begin on October 15 and ends on October 14. Submission of report must be made within 90 days from the end of the reporting period. The permittee may submit one report for multiple affected facilities under Subpart OOOO to Part 60. Such reports shall include the he following information:

i. The company name and address of the affected facility

ii. An identification of each affected facility being included in the annual report.

iii. Beginning and ending dates of the reporting period.

iv. A certification by a certifying official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

v. The records as required in Condition 4.4.4. for each affected compressor.
[40 CFR §60.5420(b) and (b)(4)(ii)]

5.0. Source-Specific Requirements Microturbine Generator

Field Code Changed

5.1. Limitations and Standards

5.1.1. 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 (EUGEN-1 and EUGEN-2) shall not exceed 6,980 cubic feet per hour and 61.15 x 10^6 cubic feet per year for each engine.

5.1.2. Maximum emissions from each microturbine generator (EPGEN-1 and EUGEN-2) 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	0.56	2.46
Volatile Organic Compounds	0.01	0.06
Formaldehyde	0.01	0.02

5.2. Recordkeeping Requirements

5.2.1. To demonstrate compliance with sections 6.1.1-6.1.2, 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.

Field Code Changed

6.0. Specific Requirements for the Dehydration Units

6.1. Limitations and Standards

6.1.1. Maximum Throughput Limitation. To demonstrate compliance with Section 10.1.5, 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	53.8 mmscf/day
EPSTL-2	53.8 mmscf/day
EPSTL-3	53.8 mmscf/day

Field Code Changed

6.1.2. Visible emissions from Emission Point EPRBL-1 and EPRBL-2 shall be limited to ten (10) percent opacity or less based on a six (6) minute average. Compliance with this limit is satisfied by complying with Condition 6.1.3.
[45 CSR §2-3.1]

Comment [RD19]: Please add EPRBL - 3

Comment [KH20]: 3 reboilers total

6.1.3. Each reboiler for these dehydration units shall only be fuel with the non-condensable gas from the respective BTEX Condenser and BTEX Accumulator, fuel gas generator by the condensate stabilizer, or any combination of these two fuels.

Comment [RD21]: Fuel for the reboiler comes from the non-condensable in the condenser, flash tank and fuel gas skid

Comment [KH22]: Fuel gas is also burned by the reboiler to supplement non-condensables and flash tank off gas as fuel

6.1.4. The emissions released from each of these emission points EPRBL-1, EPRBL-2, and EPRBL-3 (combustion stack of the reboiler) shall not exceed the following limits:

Table 10.1.4. Emission Limits for EPRBL-1, EPRBL-2, and EPRBL-3		
Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual* Emissions (ton/year)
Nitrogen Oxides	0.09	0.38
Carbon Monoxide	0.07	0.32
Volatile Organic Compounds	0.50	2.15
Benzene	0.03	0.11
Total HAPs	0.15	0.61

Comment [RD23]: Highlighted values are higher then what is represented in the permit application. Please adjust values.

6.1.5. The still vent of each dehydration unit shall be vent to a dedicated BTEX Condenser and BTEX Accumulator (2-phase separator) though a closed vent system. The non-condensable gas from the each BTEX Accumulator shall be vented back to the respective reboiler though a closed vent system.

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

6.1.7. Each dehydration unit (EPRBL-1, EPRBL-2 and EPRBL-3) shall be designed and operated in accordance with the following:

a. The non-condensable gas from the BTEX Accumulator shall be routed to the reboiler and combusted though a closed vent system.

b. The flash tank off-gases from each flash tank shall be routed to flash gas header to condensate stabilizer, or routed to the APCFLARE. The routing of the flash tank off-gases shall be done through a closed vent system.

c. The pilot light for each reboiler burner shall be lit at all times when the dehydration unit is in operation.

d. The maximum flow rate of glycol through each dehydration unit shall not exceed 15 gpm. The unit be operated either with an electric or gas pneumatic driven pumps that does not exceed the above flow rate.

e. The maximum temperature of the outlet stream from the BTEX Condenser shall not be above 120°F on a 3-hour average basis.

6.1.8. Any closed vent system required in this section shall be installed, and maintained to minimize any fugitive escape of regulated air pollutants (leak). Any above-ground piping, valves, pumps, etc. that shows signs of excess wear and that have a reasonable potential for fugitive emissions of regulated air pollutants shall be replaced.

6.1.9. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

6.2. Monitoring Requirements

6.2.1. The permittee shall monitor the throughput of wet natural gas fed to each of the dehydration systems on a monthly basis (EUDHY-1 EUDHY-2, and EUDHY-3). Records of such monitoring shall be maintained in accordance with Condition 3.4.1.

6.2.2. The permittee shall monitor the throughput of liquid gathered in storage from each of the condensers (APCCOND-1, APCCOND-2, APCCOND-3) on a monthly basis. Records of such monitoring shall be maintained in accordance with Condition 3.4.1.

6.2.3. The permittee shall monitor the temperature of the outlet stream of each BTEX Condenser (APCCOND-1, APCCOND-2, and APCCOND-3) on a daily basis for the purpose of demonstrating compliance with Condition 6.1.8.e. The permittee is may use a portable temperature measuring device. Only one measurement is required to be measured per day if the measured temperature is at or less than 120°F. For readings above 120°F, the permittee shall take additional measurements in equal time intervals to develop a 3-hour average. Records of such monitoring shall be maintained in accordance with Condition 3.4.1. and include the time and date of measurements.

6.2.4. The permittee shall monitor and maintain quarterly records (calendar year) for each component of the closed vent system that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory

Comment [RD24]: The flash tank provides fuel to each reboiler. What is not consumed in the reboiler is recompressed and sent to the inlet of the station to be recycled. None of the off gas is vented to atmosphere.

Comment [RD25]: Please remove. Temperatures will not exceed 120F.

Comment [KH26]: Please remove this section as this requirement is too vague and subjective. The G80A is no longer going to be used so this requirement is no longer valid.

Comment [KH27]: Please remove. We would like the flexibility to monitor the throughput from either the wet or dry side.

Comment [RD28]: Remove

(AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping, loose connections, liquid leaks, or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown. Records of such inspections shall be maintained in accordance with Condition 3.4.1 [45CSR§13-5.11.]

Comment [RD29]: Remove. This is verbiage from the proposed G80A general permit. The G80A is no longer going to be used so this requirement is no longer valid.

6.3. Recordkeeping Requirements

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

Comment [KH30]: Numbering is slightly off

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

6.4.4. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.6.3.4.

6.4.4. For the purpose of demonstrating compliance with section 3.1.7. and 6.1.6, 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.

7.0. Specific Requirements for the APCFLARE

7.1. Limitation and Standards

7.1.1. The permittee shall install a flare (APCFLARE) to control VOC emissions from upset conditions or maintenance activities as needed. To demonstrate compliance with Condition 1.2, the quantity of flare gas that shall be consumed in the flare shall not exceed 667,776 cubic feet per day with an annual rate not to exceed 180.3 MMscf/yr. Compliance with the flare gas throughput limit shall be demonstrated using a rolling 12-month total.

Comment [RD31]: Not sure where the flare gas value came from. Please continue to use section 8.1.1 from Permit R13-2831D

7.1.2. Maximum emissions from the flare (APCFLARE) shall not exceed the following limits:

Table 7.1.2. Emission Limits for APCFLARE

Pollutant	Maximum Hourly Rate (lb/hr)	Maximum Annual Rate (tpy)
VOC	18.48	2.43
NO_x	2.89	0.45
CO	15.62	2.11

7.1.3. The permittee shall operate and maintain the flare (APCFLARE) in a manner to minimize emissions. Such operation of the flare shall constitute the following:

a. The flare shall not exhibit any visible emissions, expect for periods not to exceed a total of 5 minutes during two consecutive hours.
[45 CSR §6-4.3.]

b. The pilot flame for the flare shall be lit at all times when any emission source at the permitted facility is operating that can generate effluent to be routed to the flare. The fuel source for the pilot light shall be either natural gas, flash tank off gas, or a combination of the two fuels.

c. The flare shall be constructed, operated, and maintained to achieve, at the minimum, 98% destruction efficiency for VOCs and volatile HAPs.

7.1.4. The effluent being routed to the flare shall not contain hydrogen sulfide in a concentration of greater than 50 grains per 100 cubic feet of carrier gas.
[45 CSR §10-5.1.]

7.1.5. The effluent and purge gas streams routed to the flare in a closed vent system. Such system shall be installed, and maintained to minimize any fugitive escape of regulated air pollutants (leak). Any above-ground piping, valves, pumps, etc. that shows signs of excess wear and that have a reasonable potential for fugitive emissions of regulated air pollutants shall be replaced.

Comment [RD32]: Remove

7.1.6. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

Comment [RD33]: Remove

7.2. Monitoring Requirements

7.2.1. The permittee shall monitor the throughput of effluent to the flare on a monthly basis. Such records shall be maintained in accordance with Condition 3.4.1.

Comment [RD34]: Please change monitor to calculate. A meter cannot be placed after the safety devices. Any release from the PSVs will have to be calculated.

7.2.2. The presence of a flame the APCFLARE and identify any periods there was no flame present. Such records shall be maintained in accordance with Condition 3.4.1.

7.2.3. For the purpose of demonstrating proper operation of the APCFLARE, the permittee shall conduct a visible emission observation using Section 11 of Method 22 for one hour once every calendar quarter in which flare was in service. If during the first 30 minutes of the observation there were no visible emission observed, the permittee may stop the observation.

If at the end of the observation and visible emission were observed for more than 2 minutes, then the permittee shall follow manufacture's repair instruction, if available or best combustion engineering practice as outline in the unit inspection and maintenance plan. To return the flare to compliant operation, the permittee shall repeat the visible emission observation. Records of such monitoring and repair activities shall be maintained in accordance with Condition 3.4.1.

Comment [RD35]: Remove

7.2.4. The permittee shall monitor and maintain quarterly records (calendar year) for each component of the closed vent system that was inspected for fugitive escape of regulated air pollutants. Each component shall operate with no detectable emissions, as determined using audio-visual-olfactory (AVO) inspections, USEPA 40CFR60 Method 21, USEPA alternative work practice to detect leaks from equipment using optical gas imaging (OGI) camera (ex. FLIR camera), or some combination thereof. AVO inspections shall include, but not limited to, defects as visible cracks, holes, or gaps in piping, loose connections, liquid leaks, or broken or missing caps or other closure devices. If permittee uses USEPA Method 21, then no detectable emissions is defined as less than 500 ppm in accordance with Method 21. If permittee uses an OGI camera, then no detectable emissions is defined as no visible leaks detected in accordance with USEPA alternative OGI work practices.

If any leak is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown. Records of such inspections shall be maintained in accordance with Condition 3.4.1.
[45CSR§13-5.11.]

Comment [RD36]: Remove. G80A is being redone. This language comes from that GP. Any leakages would be defined at 10,000 ppm per Subpart KKK because of the startup date of the facility. US EPA M-21 does not set a leakage rate.

7.3. Testing Requirements

7.3.1. In order to demonstrate compliance with the flare opacity requirements of 7.1.3.c., the permittee shall conduct a Method 22 opacity test for at least two hours. This test shall demonstrate no visible emissions are observed for more than a total of 5 minutes during any 2 consecutive hour period using 40CFR60 Appendix A Method 22. The permittee shall conduct this test within one (I) year of permit issuance or initial startup whichever is later. The visible emission checks 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 40 CFR part 60, appendix A, Method 22 or from the lecture portion of 40 CFR part 60, appendix A, Method 9 certification course.

7.4. Recordkeeping Requirements

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

8.0 Specific Requirements for the Hot Oil Heater

8.1 Limitations and Standards

8.1.1. Maximum emissions from the 3.35 MMBtu/hr Hot Oil Heater (EPOH-1) shall not exceed the following limits:

Table 8.1.1. Emission Limits for the Hot Oil Heater		
Pollutant	Maximum Hourly (lb/hr)	Maximum Annual (tpy)
NO_x	~~0.28~~0.29	~~1.22~~1.29
CO	~~0.23~~0.25	~~1.02~~1.08
VOC		

8.1.2. To demonstrate compliance with Section 8.1.1, the quantity of natural gas that shall be consumed in the 3.35 MMBtu/hr Hot Oil Heater (EUOH-1) shall not exceed 3,350 cubic feet per hour and 29.35 x 10^6 cubic feet per year. The natural gas used as fuel for this emission unit shall not a total sulfur content of X.

Comment [RD37]: Please update emission rates and fuel usage to reflect the application

Comment [RD38]: Please define X

8.1.3. Visible emissions from Emission Point EPOH-1shall be limited to ten (10) percent opacity or less based on a six (6) minute average. Compliance with this limit is satisfied by complying with Condition 8.1.2.
[45 CSR §2-3.1]

8.2. Monitoring Requirements

8.2.1. To demonstrate compliance with Conditions 8.1.1-8.1.3, the permittee shall maintain records of the amount of natural gas consumed in the Hot Oil Heater (EUOH-1) for each month of operation and maintain a 12-month rolling total. Such records shall be maintained in accordance with Condition 3.4.1.

9.0. Specific Requirements for Storage Tanks and Unloading Operations

9.1. Limitations and Standards

9.1.1. Vapors from the storage tanks (EPTK-1 – EPTK-12) shall captured by a vapor recovery unit (VRU) system while the any of the respective vessels are service, which include vessels that are empty but not degassed, and recompress the vapors back into a pipeline segment. The operational availability of the vapor recovery unit (VRU) system shall be 98% on a calendar year basis. No component of the close vent system of the VRU system shall exhibit any detectable emissions. Detectable emissions are defined as a concentration of 500 ppm or greater in accordance with U.S EPA Method 21. If the permittee is use a optical gas imaging camera, detectable emissions is defined as any visible leaks detected in accordance with U.S. EPA Alternative OGI work practices.

Field Code Changed

Comment [RD39]: US EPA does NOT define an emission limit. IT only established testing methodology. Because of the date the station was built it would be subject to Subpart KKK, which establishes a leak definition of 10000 ppm. Please change the leak definition in this section to 10000 ppm.

If any leak or detectable emissions is detected, the permittee shall repair the leak as soon as possible. The first attempt at repair must be made within five (5) calendar days of discovering the leak, and the final repair must be made within fifteen (15) calendar days of discovering the leak. The permittee shall record each leak detected and the associated repair. The leak will not be considered repaired until the same monitoring method or a more detailed instrument determines the leak is repaired.

Delay of repair of a closed vent system for which leaks or defects have been detected is allowed if the repair is technically infeasible without a shutdown, or if you determine that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. The permittee must complete repair of such equipment by the end of the next shutdown.

9.1.2. The vapor recovery system must be installed and operating prior to start-up of the storage tanks (EPTK-1 – EPTK-12).

9.1.3. During unloading operations of EPTK-1 through EPTK-12 into trucker trucks, the permittee shall operate the natural gas liquids truck loading (EP-LOAD) operations shall be in accordance with the following requirements:

a. The maximum amount of liquids unloaded from all vessels shall not exceed 13.8 million gallons on a 12-month rolling total.

b. All trucks shall be loaded using the submerged-fill method;

c. The permittee shall, at all times trucks are being loaded with VOC-containing liquids, utilize a system of activated carbon canisters (carbon adsorption) to control captured VOC emissions from the tanker truck;

d. The capture system directing VOC emissions to the activated carbon canisters shall be installed, designed, and maintained so as to achieve a minimum capture efficiency of 70.00%; and

e. The activated carbon canisters shall be installed, designed, and maintained so as to achieve a minimum VOC control efficiency of 95.00%.

9.1.4. **Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
[45CSR§13-5.11.]

9.2. Monitoring Requirements

9.2.1. The permittee shall monitor any by-pass device of the closed vent system once per operating day or shall install a continuous monitoring system that indicates opening a by-pass device and records date and length of time the device was open. Such records shall be maintained in accordance with Condition 3.4.1.

Comment [RD40]: Remove

9.2.2. For the purposes of demonstrating compliance with the maximum throughput limitations set forth in Condition 11.1.3., the permittee shall monitor and record monthly and rolling twelve month total of liquid throughput during truck loading operations.

9.2.3. For the purposes of demonstrating compliance with under 11.1.3.e, the permittee shall monitor the saturation levels of the activated carbon canisters and, according to manufacturer's recommendations, replace the activated carbon when it reaches a saturation level that is unable to sustain the minimum control percentage requirement.

Comment [KH41]: Think this should be 9.1.3.e

9.3. Testing Requirements

9.2.1. For the purposes of demonstrating the close vent potion of the VRU system, the permittee shall conduct monitoring of the vent system to include the tanks (EPTK-1 – EPTK-12). 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).

Comment [RD42]: Please specify that the leak definition is that of Subpart KKK and is 10,000 ppm

Such testing shall be conducted in accordance with Condition 3.3.1.

9.4. Recordkeeping Requirements

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

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

a. The equipment involved.

b. Steps taken to minimize emissions during the event.

c. The duration of the event.

d. The estimated increase in emissions during the event.

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

e. The cause of the malfunction.

f. Steps taken to correct the malfunction.

9.3.3. The permittee shall record the cumulative number of hours of operation of the VRU compressor and hours any of the permittee storage vessels of this section was in service for each calendar year. Such records shall be maintained in accordance with Condition 3.4.1.

9.3.4. The permittee shall maintain records of all times the activated carbon was replaced in the carbon canisters pursuant to Condition 9.2.3. Such records shall be maintained in accordance with Condition 3.4.1.

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.

Andrews, Edward S

From:	Hong, Kijun <Kijun.Hong@williams.com>
Sent:	Monday, October 19, 2015 3:49 PM
To:	Andrews, Edward S
Cc:	Ikard, Kristin; Hill, Jaron
Subject:	RE: Predraft for AMS Miller Station R13-2831E
Attachments:	Capstone C600 Spec Sheet.pdf

Mr. Andrews,
Per our phone conversation today, we would like to request a 3rd Capstone C600 Microturbine Generator be included in the permit as EPGEN-3.

Please allow for full time operation as represented by the other (2) units.

The manufacture spec sheet has been included which documents the NOx emission factor of 0.14 g/hp-hr. CO, VOC, and PM emissions were calculated using AP-42 factors. SO2 emissions were calculated using mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel.

Please let me know if there are any questions or if there is anything else we can provide.

ID # 51-130
Reg R13-2831E
Company AMS
Facility Miller Initials [illegible]

Thank You,
Kijun

My e-mail address has changed to Kijun.Hong@Williams.com.
Please ensure you have my correct email contact information in your records.

Williams.
Kijun Hong | Williams | Specialist - Air | EHS
Office: 405-727-1245 | Cell: 405-694-7815 | Fax: 405-727-3245
525 Central Park Drive, Ste. 1005 | Oklahoma City, OK 73105-1723

From: Hong, Kijun
Sent: Monday, October 19, 2015 11:47 AM
To: 'Andrews, Edward S' <Edward.S.Andrews@wv.gov>
Subject: RE: Predraft for AMS Miller Station R13-2831E

Hi Mr. Andrews,
I wanted to follow up on this and see if there was anything else you needed from our end.

Do you have an estimated time frame as to when the permit would be issued?

From: Hong, Kijun
Sent: Friday, July 10, 2015 11:41 AM
To: 'Andrews, Edward S' <Edward.S.Andrews@wv.gov>
Subject: RE: Predraft for AMS Miller Station R13-2831E

Entire Document
NON-CONFIDENTIAL

Mr. Andrews,
Please find attached our comments on the draft permit. Thank you for allowing us the opportunity to review and submit our remarks.

Please let me know if you have any questions or if there is anything else we can provide.

Thanks Again!
Kijun

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Friday, June 26, 2015 12:26 PM
To: Hong, Kijun
Subject: Predraft for AMS Miller Station R13-2831E

Kjiun: I made some fairly significant changes to the permit. I have to re-do my concentration numbers for the engines so that you can review them as well. One of formulas I used got cut off.

Should you have any question/comments/concerns/suggestions, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

C600 600 kW Power Package
High-pressure Natural Gas

Capstone®

World's largest air-bearing microturbine produces 600kW of clean, green and reliable power.

- High electrical efficiency over a very wide operating range
- Low maintenance air bearings require no lube oil or coolant
- Ultra-low emissions
- High availability – part load redundancy
- Proven technology with tens of millions of operating hours
- Integrated utility synchronization and protection with a modular design
- 5 and 9 year factory protection plans available
- Remote monitoring and diagnostic capabilities
- Upgradable to 800 kW or 1 MW with field installed Capstone 200 kW power modules
- Internal fuel gas compressor available for low fuel pressure Natural Gas applications

C600 MicroTurbine

Electrical Performance(1)

Electrical Power Output	600 kW
Voltage	400 to 480 VAC
Electrical Service	3-Phase, 4 wire
Frequency	50/60 Hz, grid connect operation 10-60 Hz, stand alone operation
Maximum Output Current	870A RMS @ 400V, grid connect operation 720A RMS @ 480V, grid connect operation 930A RMS, stand alone operation(2)
Electrical Efficiency LHV	33%

Fuel/Engine Characteristics(1)

Natural Gas HHV	30.7 to 47.5 MJ/m³ (825 to 1,275 BTU/scf)
Inlet Pressure(3)	517-552 kPa gauge (75-80 psig)
Fuel Flow HHV	7,200 MJ/hr (6,840,000 BTU/hr)
Net Heat Rate LHV	10.9 MJ/kWh (10,300 BTU/kWh)

Exhaust Characteristics(1)	Standard	CARB Version
NOx Emissions @ 15% O_2 (4)	9 ppmvd (18 mg/m³)	4 ppmvd (8 mg/m³)
NOx/Electrical Output(4)	0.14 g/bhp-hr (0.4 lb/MWhe)	0.05 g/bhp-hr (0.14 lb/MWhe)
Exhaust Gas Flow	4.0 kg/s (8.8 lbm/s)	4.0 kg/s (8.8 lbm/s)
Exhaust Gas Temperature	280°C (535°F)	280°C (535°F)
Exhaust Energy	4,260 MJ/hr (4,050,000 BTU/hr)	4,260 MJ/hr (4,050,000 BTU/hr)

Reliable power when and where you need it. Clean and simple.

Dimensions & Weight[5]

Width x Depth x Height	2.4 x 9.1 x 2.9 m (96 x 360 x 114 in)
Weight - Grid Connect Model	11475 kg (25,300 lbs)
Weight - Dual Mode Model	13326 kg (29,380 lbs)

Minimum Clearance Requirements[6]

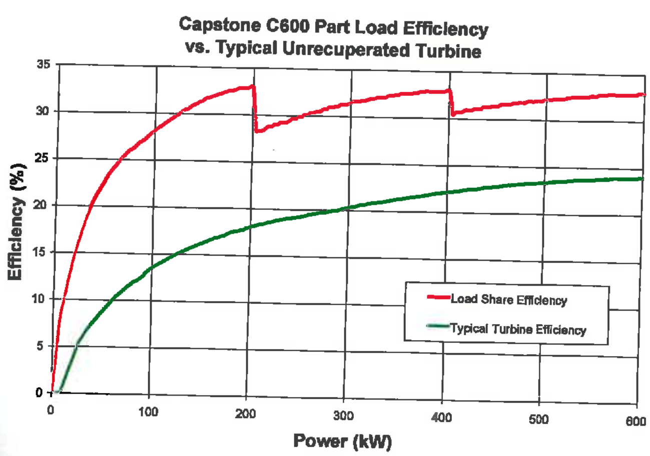
Vertical Clearance	0.6 m (24 in)
Horizontal Clearance	
Left & Right	1.5 m (60 in)
Front	1.5 m (60 in)
Rear	1.8 m (72 in)

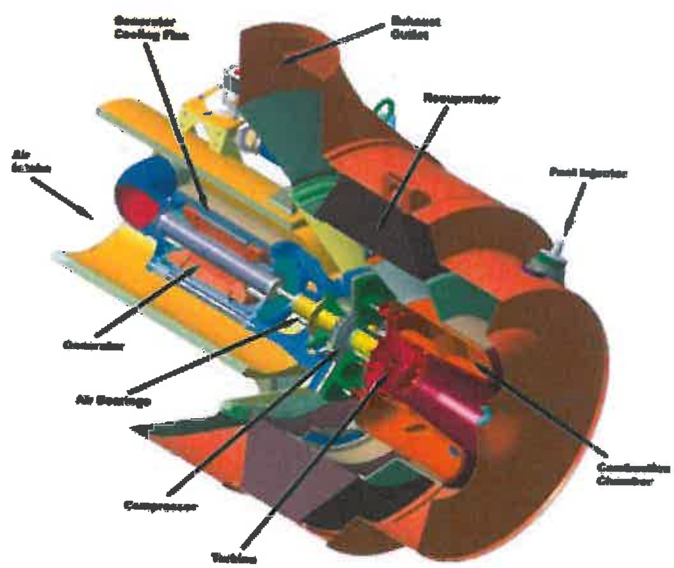
Sound Levels

Acoustic Emissions at Full Load Power Nominal at 10 m (33 ft)	65 dBA

Planned Certifications

- UL 2200 and UL 1741 for natural gas operation under exsisting UL files[7]
- Will comply with IEEE 1547 and will meet statewide utility interconnection requirements for California Rule 21 and the New York State Public Service Commission
- Models will be available with optional equipment for CE marking





C200 Engine

(1) Nominal full power performance at ISO conditions: 59°F, 14.696 psia, 60% RH
(2) With linear load
(3) Inlet pressure for standard natural gas at 39.4 MJ/Nm³ (1,000 BTU/scf) (HHV)
(4) Emissions for standard natural gas at 39.4 MJ/Nm³ (1,000 BTU/scf) (HHV)
(5) Approximate dimensions and weights
(6) Clearance requirements may increase due to local code considerations
(7) All models are planned to be UL Listed or available with optional equipment for CE marking

Specifications are not warranted and are subject to change without notice.

Capstone

21211 Nordhoff Street • Chatsworth • CA • 91311 • 877.716.2929 • 818.407.3770 • www.capstoneturbine.com

 10/08 Capstone P/N 331050A

Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Wednesday, May 13, 2015 3:15 PM
To: Andrews, Edward S
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E
Attachments: Miller Carbon Canister Specs-2.pdf; Miller Flare Specs.pdf; Miller Flash Modeling.pdf; Miller BTEX Buster Specs.pdf; Miller Carbon Canister Specs-1.pdf

Mr. Andrews, please see below for the rest of the information requested.

Thank You.
Kijun

ID # 51-130
Reg R13-2831E
Company AMS
Facility Miller CS Initials [illegible]

From: Hong, Kijun
Sent: Thursday, May 07, 2015 10:04 AM
To: 'Andrews, Edward S'
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E

Hi Mr. Andrews,
I am still working on getting some of this info but here is what I have so far. Please see responses below.

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Tuesday, May 05, 2015 12:46 PM
To: Hong, Kijun
Subject: Appalachia Miller Compressor Station Application R13-2831E

Mr. Hong:

I just have a few information requests and several questions concern the Miller.

The application implies that EUCE-1, EUCE-9 through EUCE-11 has already been removed. Is there a forecasted installation date on the new compressor engines? **We do not have a forecasted install date as of yet.**

For EUCE-7 & 8, are the changes to these engines limited to updating the emissions (CO, VOC, PM10, CPM, SO2)? **Yes, this was due to using a more recent fuel analysis. I believe Formaldehyde and total HAPs changed as well.**

Are all of the Caterpillar compressor engines equipped with the EMIT ELH-4200-1616F-4CEE-242 Catalyst? **All the catalysts are different. The listed emit catalyst may or may not be the element that is used. All catalysts will meet or exceed the reductions of the above Emit element.**

For the emission point for the compressor blowdowns, is this emission point an actual vent that all compressor vent to or fugitive emissions within the compressor building? **Each unit has its own blowdown stack.**

Could you provide the ProMax Report that was used to determine the flash emissions from the Storage Tanks? **Attached**

Could you provide the manufacturer's data sheet on the flare, carbon canister adsorption, and the BTEX buster? **Attached**

Were all of the stabilized condensate and pipeline fluids tanks placed into service prior to August 23, 2011? **Yes all were set and started prior to 8-23-11**

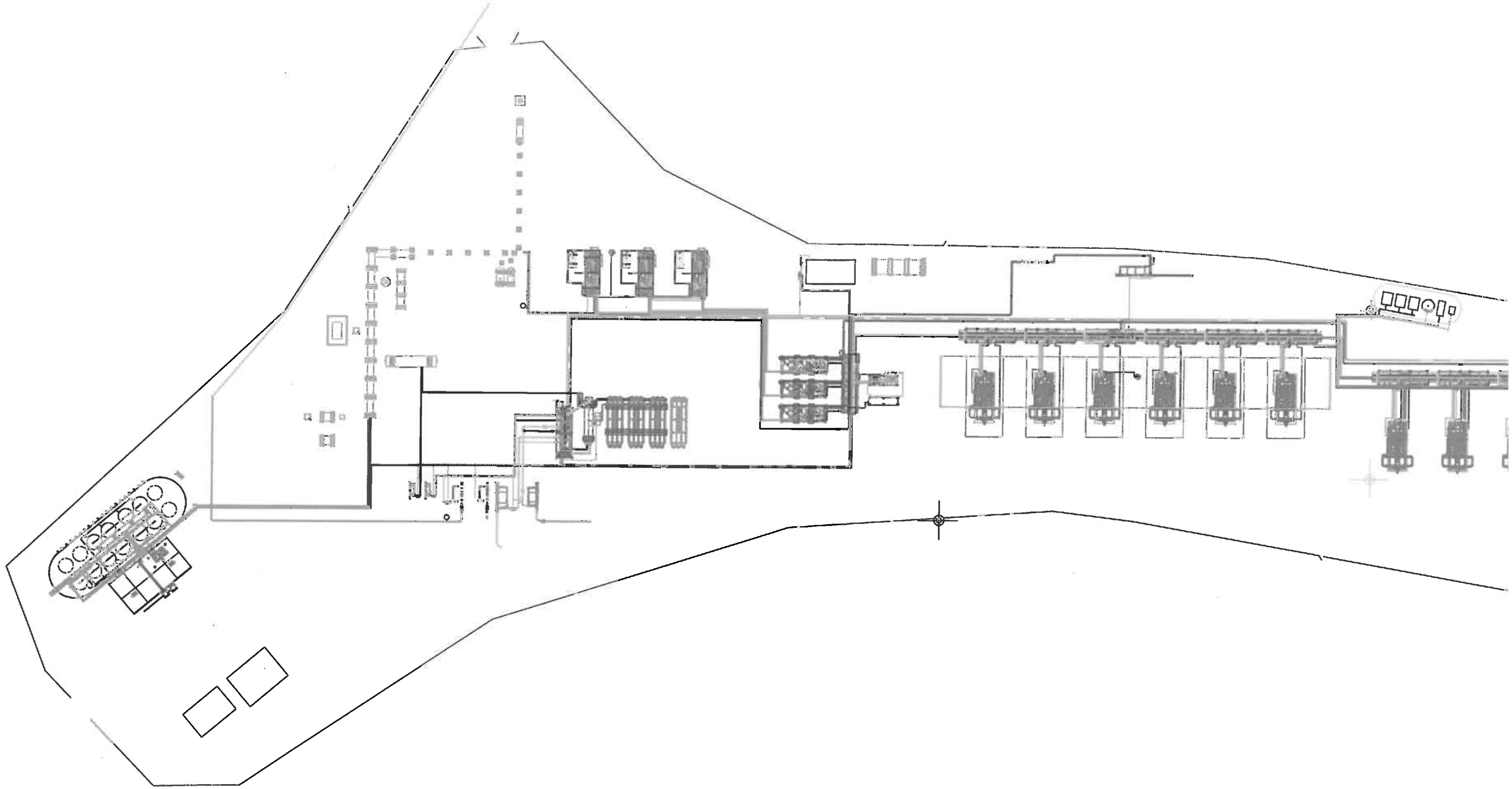
Entire Document
NON-CONFIDENTIAL

Are there any pneumatic controllers located at the facility that was installed after August 23, 2011? **Station uses air to drive pneumatics.**

Should you have any questions about this request or your application, please contact me.

Sincerely,

Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214



CAMERON GREAT LAKES, INC.

MOLECULAR FILTRATION SPECIALISTS

VAPOR SCRUB

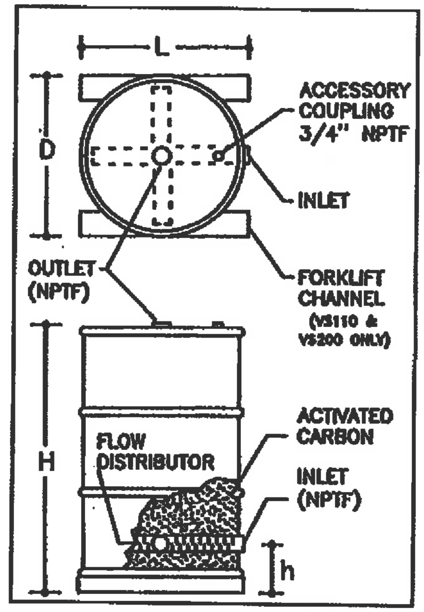
Models VS30-100 - VS55-200 - VS85-300 - VS110-400 - VS200-600

CGL **Vapor Scrub** units, filled with high quality Cameron/Great Lakes activated carbon, are designed for effective purification of your vapor waste or process stream. CGL **Vapor Scrub** units have a proven ability to remove organic contaminants to non-detectable levels.

CGL **Vapor Scrub** units are constructed of heavy-duty mild steel and are lined with double layered epoxy coatings. Forklift channels are provided on the VS110 & VS2OO models. Adsorber internals consist of a PVC cross-style inlet flow distributor designed for complete carbon bed use. Upflow operation is standard.

For ease in process maintenance, spent carbon can be removed on site from the vessel by hand or vacuuming out by removing the vessel top head. Alternatively, the spent vessel can be shipped off site for reactivation service or disposal.

(Please contact your nearest CGL office or representative for additional information on disposal and service options.)



SPECIFICATIONS

Model VS	30-100	55-200	85-300	110-400	200-600
H-height, in.	30	36	40	46	51
D-diameter, in.	19	24	26	32	36
L-length, in.	na	na	na	32	36
h-height, in.	4.3	6	5	8	8
Inlet & Outlet Connection, in.	2	2	3	4	6
Flow Range, cfm*	60-100	80-150	110-200	160-300	210-400
Pressure Drop Range, in.w.g.	2.3-6.8	2.7-8.0	3.0-9.0	3.4-10.3	3.0-10.0
Max Pressure, psig	8	8	8	8	8
Max Temp, deg. F	125	125	125	125	125
Carbon Capacity Weight, lbs.	100	200	300	400	600
Volume, cu. ft.	3.9	7.1	10.0	16.1	20
Shipping Weights, lbs	150	270	380	640	1000

2335 NW 29TH AVENUE, PORTLAND, OR 97210
PHONE: (800) 777-4044 FAX: (503) 225-0137

WWW.CAMERONGREATLAKES.COM
EMAIL: SALES@CGLCARBON.COM

ENGINEERING PROPOSAL

SAULSBURY E&C
ODESSA, TX

PROJECT

VARIABLE MACH SONIC FLARE SYSTEM

CHESAPEAKE ENERGY
MILLERS STATION
F-1010 PLANT

Prepared for: Brian Futz

Phone No.: (432)366-4252
Email: bfultz@si-tx.com

Sales Contact: Curtis Hanzalik
Regional Sales Manager – Houston & Gulf Coast
Houston, TX
T + 1 (713) 973 5767
F + 1 (713) 973 5768
C + 1 (713) 320 7347
chanzalik@flareindustries.com

Prepared by: José Peña
Applications Engineer
Austin, Texas USA
T +1 (512) 836-9473
F +1 (512) 836-3025
jpena@flareindustries.com

Date: July 1, 2010
Quote No.: 10-0076 R4

Design Results and Summary

FLARE

Quote No.:	10-0076	**Customer:** Saulsbury	**Location:** Odessa, TX
Description:	Miller Station F-1010 Plant		**Prepared by:** JMP
	Heptane - Smokeless		**Date:** 5/28/2010

AMBIENT CONDITIONS

	USCS	SI
Ambient Temperature*:	80 °F	27 °C
Wind Speed (Radiation Only):	56 mph	90.12 km/hr
Solar Radiation:	0 Btu/ft^2-hr	0 W/m^2

*Used only in Brzustowski's Radiation Calculation Method

INPUT PARAMETERS

Molecular Weight:	77.02	77.02
Max. Volumetric Flow Rate*:	14.77 MMSCFD	418,175 m^3/day
Max. Mass Flow Rate:	125,000 lbs/hr	56,699 kg/hr
Inlet Gas Temperature:	250 °F	121 °C
Total Heat Release:	2.43E+09 Btu/Hr	7.12E+05 kW

*Volumetric flow rate is considered at standard conditions.

FLARE TIP CALCULATIONS

Proposed Flare Tip:	10" Mach 1 Sonic Flare	
Flare Tip Diameter:	10 in	254 mm
Exit Velocity:	707 ft/sec	215 m/sec
Pressure Drop of Tip:	23.518 psi	162 kPa

FLARE RISER CALCULATIONS

Minimum Flare Height:	70 Ft	21.3 m
Pressure Drop of Inlet and Riser:	1.482 psi	10.2 kPa
Total Pressure Drop of Flare**:	25.000 psi	172.37 kPa

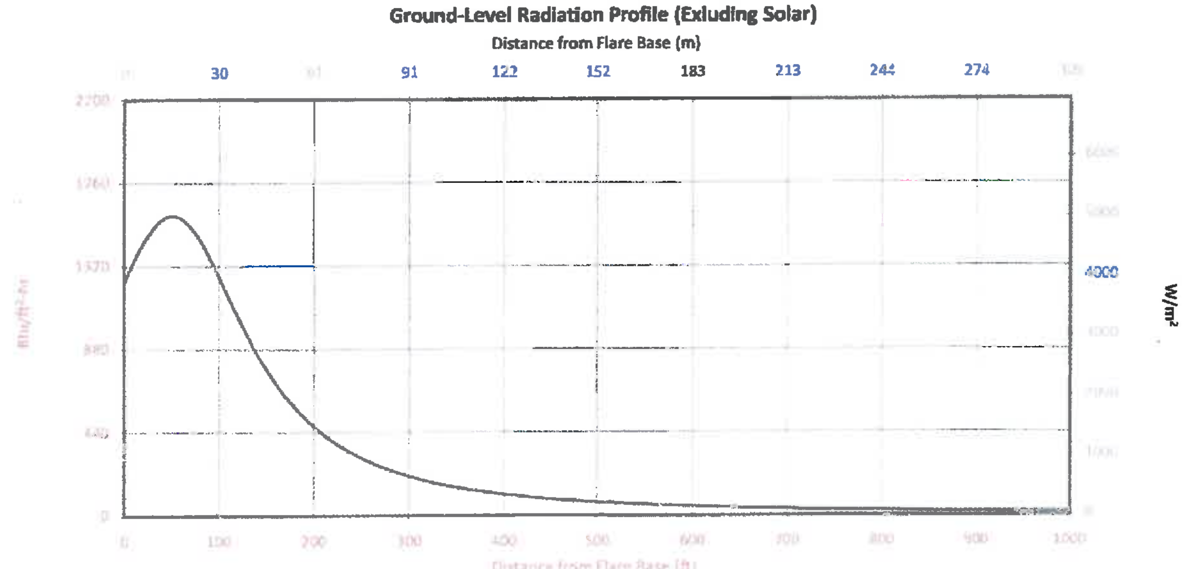
**Includes predicted inlet losses.

RADIATION RESULTS

Maximum Radiation at Grade***:	1,577 Btu/ft^2-hr	4974.4 W/m^2
Solar Radiation Considered:	0 Btu/ft^2-hr	0.0 W/m^2
Distance to Maximum Radiation:	60 ft	18.3 m

***Maximum Radiation Includes solar radiation

Ground-Level Radiation Profile (Exluding Solar)



UTILITY FLARE

BY: MAH	JOB NO: 6178	PAGE 1	OF 2
DATE: 5/18/2010	ITEM NO.: F-250		
CUSTOMER:	Chesapeake Energy		
PLANT:	Millers Station		
SERVICE:	Plant Flare		
QUANTITY:	1	SIZE:	

SAULSBURY Engineering & Construction

SAULSBURY INDUSTRIES

Texas Registered Engineering Firm F-518

Work by Saulsbury Engineering: rev. no "D"

REV.	DATE	BY	APPR.	NO.	FIRM
Design Case Flow	5/18/2010	MAH		"D"	SE&C
Miscellaneous Revisions	5/18/2010	MAH		"C"	SE&C

	Design Case	Normal Capacity	
Flow Rate, Lb/Hr	0 - 125,000 (Note 2)	0 - 2,000	
Molecular Weight	77.0	29.9	
Temperature, °F	250	120	
Maximum Pressure at Inlet Nozzle, PSIG	15 (Note 1)	15 (Note 1)	
Smokeless Operation Required (Yes/No)	Yes (Note 4)	Yes (Note 4)	
Lower Heating Value, BTU/SCF			
Composition (Mol % / Weight %)	Mol %	Mol %	
Nitrogen	0.00	0.04	
Carbon Dioxide	0.07	0.20	
Methane	2.39	36.19	
Ethane	7.54	37.49	
Propane	12.26	20.03	
Butanes	13.83	4.03	
Pentanes	11.20	1.33	
Heptane	52.71	0.69	
Hydrogen			
Oxygen			
TOTAL	100.00	100.00	

Notes

1. Develop base design to limit pressure at the flare inlet nozzle to 15 psig. A second design may be submitted for consideration with a maximum pressure at the flare inlet nozzle of 25 psig if there is significant economic incentive.
2. Provide maximum hydraulic capacity of the flare at these process conditions.
4. Flare must provide smokeless performance throughout entire range of flow capacity

UTILITY FLARE

SAULSBURY Engineering & Construction
SAULSBURY INDUSTRIES

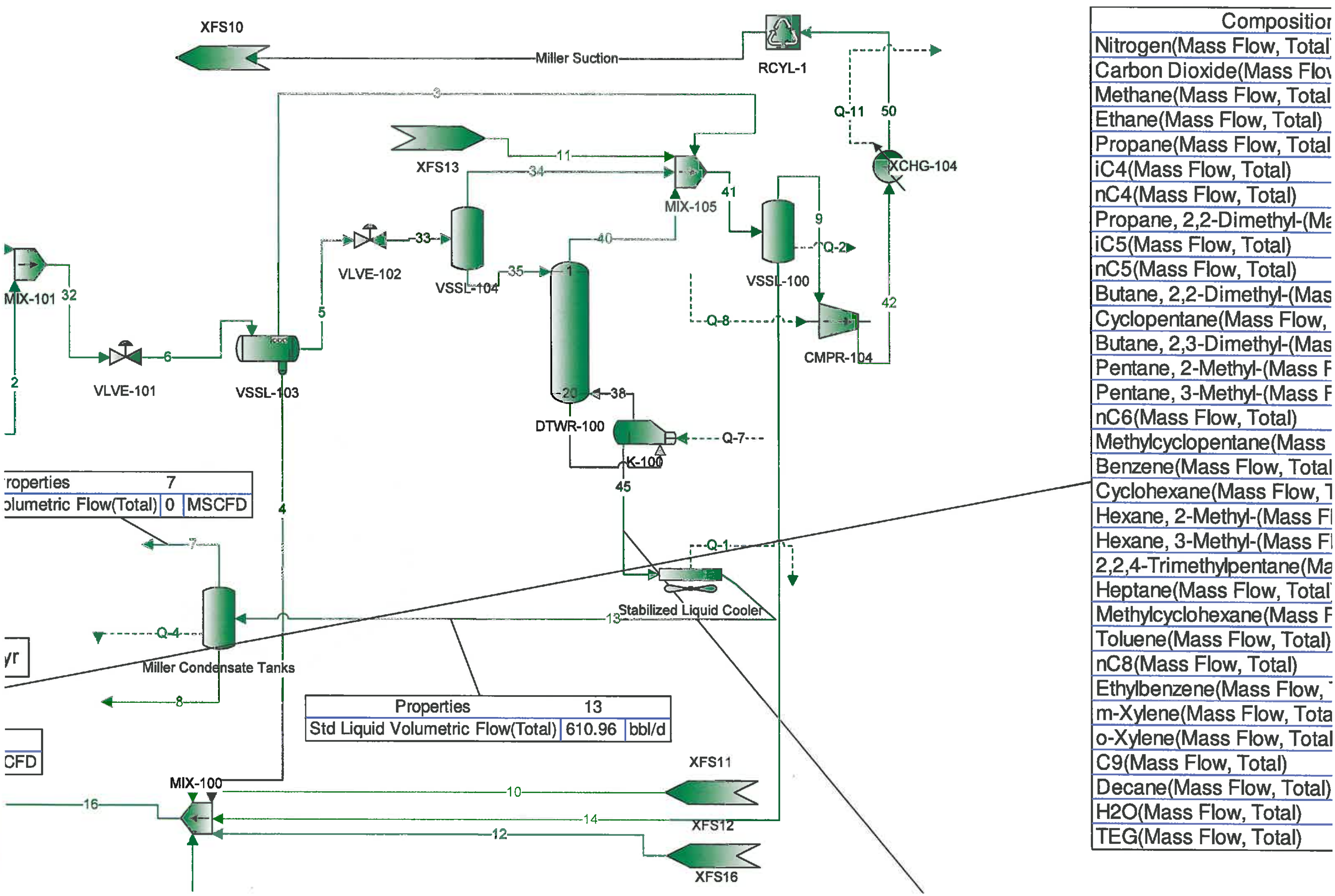
Texas Registered Engineering Firm F-518
Work by Saulsbury Engineering, rev. no. "D"

BY: MAH	JOB NO: 6178	PAGE 2	OF 2
DATE: 5/18/2010	ITEM NO.: F-250		
CUSTOMER:	Chesapeake Energy		
PLANT:	Millers Station		
SERVICE:	Plant Flare		
QUANTITY:	1	SIZE:	

Power Available	460 V	3 Phase	60 Hz
Control Power	24V	DC	
Electric Classification Area	Class 1		Div 2
Pilot Gas	Temp, F 70	MW 17.5	975 BTU/SCF
Utility Gas	Temp, F 70	MW 17.5	975 BTU/SCF
Purge Reduction	~~None~~		~~Other~~
Flare Tip	Elevated	~~Ground~~	~~Enclosed~~
Maximum Allowable Thermal Radiation, BTU/Hr/SqFt	1,500 (Note 3)		
At Grade, Specify Distance from Flare Base, Ft	100		
Stack Support	Self Supporting	~~Guy Wire~~	~~Derrick~~
Design Wind Velocity, MPH	100		
Seismic Zone	1		
Flare Knockout	~~Integral~~	~~External by Vendor~~	External by Others
Design Pressure, PSIG / Temperature, F / Corr Allow	NA		
ASME Code Stamp / National Board Registration	NA		
Ignition Device	~~Flame Front~~	Spark	
Enclosure	NEMA 4X	~~NEMA 7~~	
Ladder Platforms	None		

REV.	DATE	BY	APPR.	NO.	FIRM
Miscellaneous Revisions	5/18/2010	MAH		"C"	SE&C
Design Case Flow	5/18/2010	MAH		"D"	SE&C

Notes:
3. Provide maximum thermal capacity of flare based on this criteria


XFS10
Miller Suction
RCYL-1
Q-11
50
XCHG-104
3
XFS13
11
34
MIX-105
41
9
Q-2
VSSL-100
42
CMPR-104
Q-8
40
33
VLVE-102
VSSL-104
35
1
20
38
DTWR-100
Q-7
K-100
45
MIX-101
32
2
VLVE-101
6
5
VSSL-103
4
roperties 7
olumetric Flow(Total) 0 MSCFD
7
Q-1
Stabilized Liquid Cooler
13
Q-4
Miller Condensate Tanks
8
Properties 13
Std Liquid Volumetric Flow(Total) 610.96 bbl/d
yr
CFD
MIX-100
16
10
14
12
XFS11
XFS12
XFS16
Compositio
Nitrogen(Mass Flow, Total
Carbon Dioxide(Mass Flo
Methane(Mass Flow, Total
Ethane(Mass Flow, Total)
Propane(Mass Flow, Total
iC4(Mass Flow, Total)
nC4(Mass Flow, Total)
Propane, 2,2-Dimethyl-(M
iC5(Mass Flow, Total)
nC5(Mass Flow, Total)
Butane, 2,2-Dimethyl-(Mas
Cyclopentane(Mass Flow,
Butane, 2,3-Dimethyl-(Mas
Pentane, 2-Methyl-(Mass F
Pentane, 3-Methyl-(Mass F
nC6(Mass Flow, Total)
Methylcyclopentane(Mass
Benzene(Mass Flow, Total
Cyclohexane(Mass Flow, T
Hexane, 2-Methyl-(Mass F
Hexane, 3-Methyl-(Mass F
2,2,4-Trimethylpentane(Ma
Heptane(Mass Flow, Total
Methylcyclohexane(Mass F
Toluene(Mass Flow, Total)
nC8(Mass Flow, Total)
Ethylbenzene(Mass Flow,
m-Xylene(Mass Flow, Tota
o-Xylene(Mass Flow, Total
C9(Mass Flow, Total)
Decane(Mass Flow, Total)
H2O(Mass Flow, Total)
TEG(Mass Flow, Total)

CAMERON

WELL SITE MIDSTREAM

NATCO BTEX BUSTER

Removes 99.7%* of BTEX and VOC emissions from glycol reconcentrator emissions

The Simple and Cost-effective Answer to Your Emission Compliance Problems

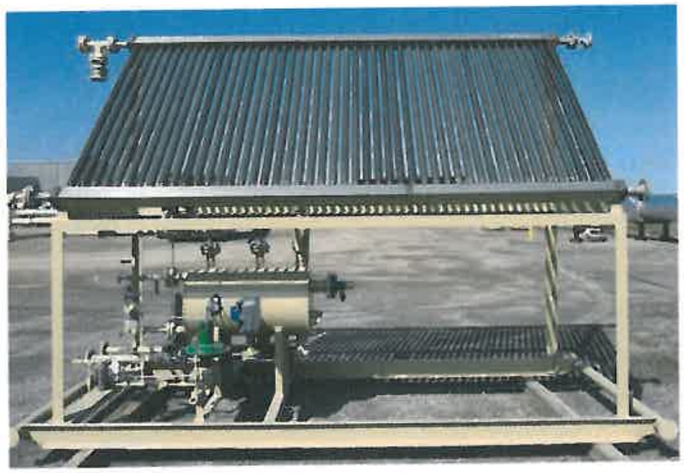
Cameron's NATCO® BTEX BUSTER® provides a removal efficiency greater than 99.7%*, helps recover and collect saleable liquid hydrocarbons and prevents the loss of expensive fuel gas from glycol reconcentrator vent emissions.

The unit is designed using the Environmental Protection Agency-approved Gri-Glycalc computer simulation program with a flash-gas separator in the glycol regeneration process. Under common operating conditions, BTEX (benzene, toluene, ethylbenzene and xylene), as well as other volatile organic compounds (VOCs), are emitted into the atmosphere during the glycol regeneration process. The rates usually are proportional to the glycol circulation rate.

The NATCO BTEX BUSTER captures those hydrocarbon emissions.

Performance

- The cost-effective system is designed to assist operators in reducing BTEX and VOC emissions below the accepted levels and complies with federal and state environmental regulations.
- Economics of the NATCO BTEX BUSTER show that it can pay for itself by recovering saleable hydrocarbon liquids and fuel gas. By condensing troublesome glycol reconcentrator vapors and routing flash gas back to the reconcentrator fuel gas inlet for burning, the unit reduces emissions during glycol plant dehydration processing.
- The NATCO BTEX BUSTER incorporates field-proven burner accessories to help prevent sooting and backpressure on your regeneration system.
- The NATCO BTEX BUSTER also features a design to eliminate potential freeze-up problems when operating in severe cold climates.
- Cameron offers the NATCO BTEX BUSTER in standard sizes to accommodate most customer needs. Our units are backed by Cameron's replacement parts, technical assistance and service available 24 hours a day.



The NATCO BTEX BUSTER cold-weather design eliminates freezing problems associated with cold climates.

How It Works

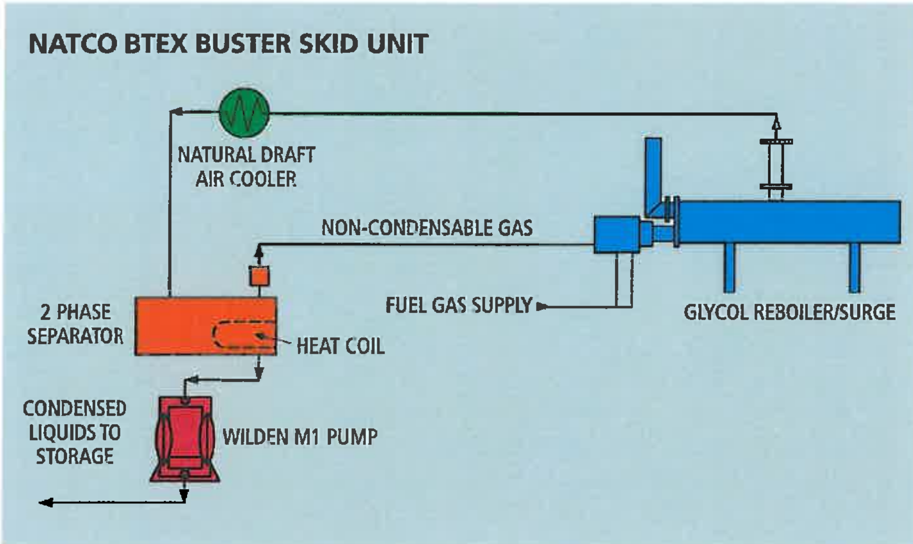
The NATCO BTEX BUSTER is a relatively simple process that is designed to maintain greater than 99.7%* removal of BTEX and VOC emissions.

The vapors emitted from the glycol still column are cooled in the natural draft air cooler to temperatures below 120° F (49° C).

The condensed liquids are collected in a small two-phase separator and pumped to customer storage. Non-condensable gases from the separator are piped through an in-line flash arrestor and then burned in the glycol reboiler firebox to achieve an overall minimum destruction efficiency of 99.7%* plus.

Features	Benefits
Ideal for Remote Locations	Natural draft self-regulating system does not require any moving pieces of equipment.
Environmentally Correct	Meets Federal Regulation 40 CFR part 63 and meets or exceeds most stringent state regulations LAC 111.2116 and LAC 33:111 chapter 51.
Efficient	Removal efficiency is greater than 99.7%*.
Reduces Operating Costs	Reduces fuel gas consumption and recovers saleable liquid hydrocarbons.
Safe	Features an in-line flash arrestor, high-level switch, pressure safety valve and gas shut-down valves.
Designed for the Oil Field	Includes field-proven burner products, and the pneumatic pump handles aromatic hydrocarbons.
Designed for Cold Weather	Cold-weather design eliminates freezing problems associated with cold climates.
Cameron's Services	Includes experienced staff and worldwide locations, 24 hours a day.

CAMERON



Built-in Safety Features

The NATCO BTEX BUSTER is engineered with proper controls for safe operation and long in-service life. These include an in-line flash arrestor, separator high-level switch, pressure safety valve and gas shut-down valves for high reboiler bath temperatures. It also incorporates field-proven burner accessories that help to prevent typical sooting and backpressures on your regeneration system.

Field-proven, the NATCO BTEX BUSTER now is available through our sales and service locations worldwide.

Standard BTEX Size (1)	Reconcentrator Duty Btu/hr	Glycol Pump gal/hr	Max Capacity water/day (2)	Non-condensable vapor/day (3)	Cooler Duty Btu/hr (3)
150	75,000	40	273	7	30,000
150	150,000	40	273	10	30,000
250	250,000	90	1216	27	51,000
375	375,000	210	1807	45	76,000
550	550,000	210	2650	60	112,000
750	750,000	450	3615	100	152,000

(1) Standard BTEX
Performance of unit is based on a non-condensable vapor HHV greater than 400 Btu/cf and less than 1800 Btu/cf and a glycol circulation rate of no more than 3 gal/lb of water removed.

(2) Maximum Capacity of Water/day
Represents the maximum capacity of water in pounds per day for each of Cameron's standard reboiler size based on a glycol circulation rate of 2 gallons of glycol per pound of water removed.

(3) Non-condensable Vapor/day
Maximum non-condensable vapor rate was calculated with the Gri-Glycalc computer simulation program with a flash-gas separator used in the glycol regeneration process and a BTEX concentration in the inlet gas stream of no more than 700 ppm.
Using adiabatic combustion calculations, a minimum of 99.7%* of these non-condensable vapors are destroyed.

(4) Cooler Duty Btu/hr
Cooler duty was calculated based on a prevailing windspeed of 3 mph and a maximum ambient temperature of 100° F (38° C).

Note: Cameron is not responsible for the disposal of any condensed liquids associated with its BTEX BUSTER units.

* *Certain gas streams contain more BTEX and VOCs than represented by Gri-Glycalc. Consult with Cameron's engineers for system evaluation, equipment sizing and application to ensure conversion efficiency.*

LOCATIONS

United States of America
11210 Equity Dr., Suite 100
Houston, TX 77041
USA
Tel 713.849.7500

Marcellus/Utica
Laceyville 570.869.3104
Nitro 304.755.9400

Midcontinent
Oklahoma City 405.677.8827

Rockies
Casper 307.234.7183
Bloomfield 505.634.1400
Grand Junction 970.243.3600
Vernal 435.789.1796
Williston 701.774.5500

Texas
Caldwell 979.272.7101
Corpus Christi 361.289.0488
Godley 817.389.2676
Longview 903.759.2738
Odessa 432.530.3600

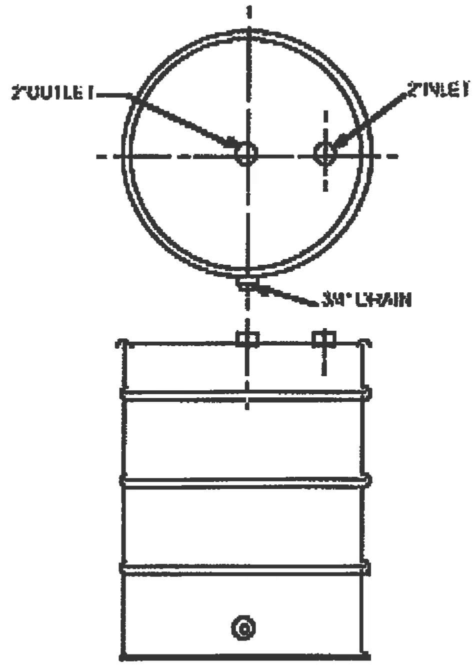
Canada
Leduc 780.986.9803

www.c-a-m.com

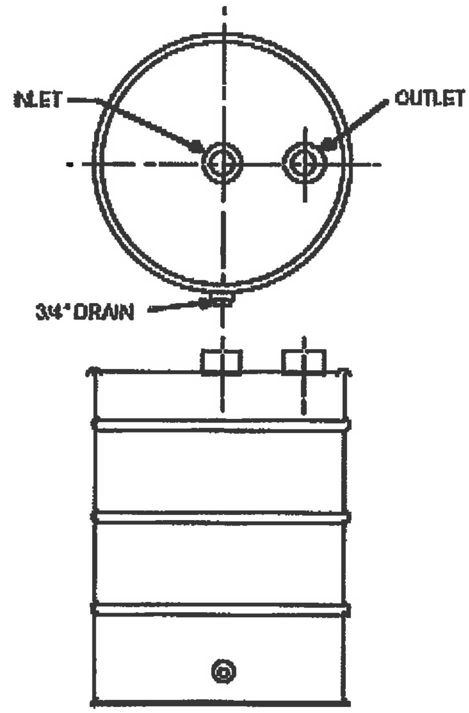
CARBTROL®

AIR PURIFICATION CANISTERS
140-200 LB. ACTIVATED CARBON

G-1
G-2
G-3



MODEL G-1



MODEL G-2,G-3

SPECIFICATIONS

MODEL	DIAMETER/HEIGHT	CARBON WEIGHT	INLET/OUTLET	MAXIMUM RATED FLOW	APPROXIMATE SHIP WEIGHT
G-1*	24"/36"	200 lbs.	2"/2"	100 CFM	250 lbs.
G-2*	24"/36"	170 lbs.	4"/4"	300 CFM	220 lbs.
G-3P	24"/36"	140 lbs.	6"/6"	500 CFM	190 lbs.
G-3S	24"/34"	140 lbs.	4"/4"	500 CFM	180 lbs.

* Specify: Polyethylene (P) or Epoxy Lined Steel (S)

SAFETY

Certain chemical compounds in the presence of activated carbon may oxidize, decompose or polymerize. This could result in temperature increases sufficient to cause ignition of the activated carbon or adsorbed material. If a compounds reaction with activated carbon is unknown, appropriate tests should be considered.

CARBTROL®
CORPORATION

955 Connecticut Ave., Suite 5202
Bridgeport, CT 06607

800-242-1150 Fax: 203-337-4347
www.carbtrol.com info@carbtrol.com

CARBTROL®

AIR PURIFICATION CANISTERS 140-200 LB. ACTIVATED CARBON

G-1
G-2
G-3

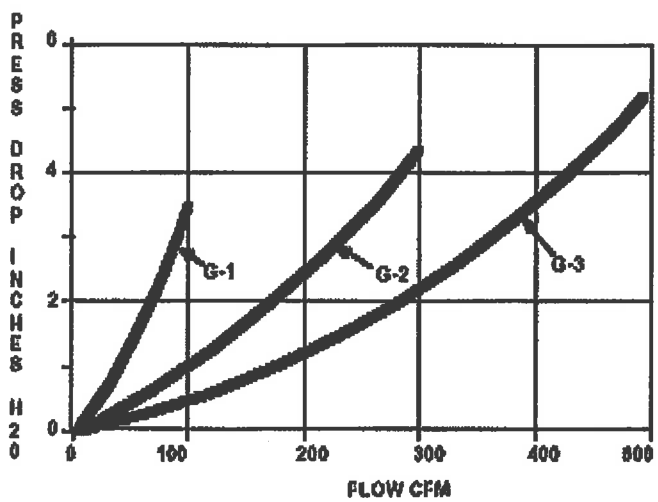
The CARBTROL "G" Canisters handles flows up to 500 CFM.

FEATURES

- High activity carbon.
- Epoxy lined steel or polyethylene construction.
- Acceptable for transport of hazardous spent carbon.
- Side drain for removal of accumulated condensate.
- Low pressure drop.
- PVC internal piping.
- High temperature (180°F) steel units available.

APPLICATIONS

- Soil vapor remediation
- Air stripper exhausts
- Tank vents
- Exhaust hoods
- Work area purification
- Sewage plant odor control



 AT-116/01

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Bridgeport, CT 06607

800-242-1150 Fax: 203-337-4347
www.carbtrol.com info@carbtrol.com

UTILITY FLARE

BY: MAH	JOB NO: 6178	PAGE 2 OF 2	
DATE: 5/18/2010	ITEM NO.: F-250		
CUSTOMER:	Chesapeake Energy		
PLANT:	Millers Station		
SERVICE:	Plant Flare		
QUANTITY:	1	SIZE:	

SAULSBURY Engineering & Construction

SAULSBURY INDUSTRIES

Texas Registered Engineering Firm F-518
Work by Saulsbury Engineering. rev. no. "D"

REV.	DATE	BY	APPR.	NO.	FIRM
Miscellaneous Revisions	5/18/2010	MAH		"C"	SE&C
Design Case Flow	5/18/2010	MAH		"D"	SE&C

Power Available	460 V	3 Phase	60 Hz
Control Power	24V	DC	
Electric Classification Area	Class 1		Div 2
Pilot Gas	Temp, F 70	MW 17.5	975 BTU/SCF
Utility Gas	Temp, F 70	MW 17.5	975 BTU/SCF
Purge Reduction	~~None~~		~~Other~~
Flare Tip	Elevated	~~Ground~~	~~Enclosed~~
Maximum Allowable Thermal Radiation, BTU/Hr/SqFt	1,500 (Note 3)		
At Grade, Specify Distance from Flare Base, Ft	100		
Stack Support	Self Supporting	~~Guy Wire~~	~~Derrick~~
Design Wind Velocity, MPH	100		
Seismic Zone	1		
Flare Knockout	~~Integral~~	~~External by Vendor~~	External by Others
Design Pressure, PSIG / Temperature, F / Corr Allow	NA		
ASME Code Stamp / National Board Registration	NA		
Ignition Device	~~Flame Front~~	Spark	
Enclosure	NEMA 4X	~~NEMA 7~~	
Ladder Platforms	None		

Notes:
3. Provide maximum thermal capacity of flare based on this criteria.

Andrews, Edward S

From: Hong, Kijun <Kijun.Hong@williams.com>
Sent: Wednesday, May 13, 2015 3:15 PM
To: Andrews, Edward S
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E
Attachments: Miller Carbon Canister Specs-2.pdf; Miller Flare Specs.pdf; Miller Flash Modeling.pdf; Miller BTEX Buster Specs.pdf; Miller Carbon Canister Specs-1.pdf

Mr. Andrews, please see below for the rest of the information requested.

Thank You.
Kijun

From: Hong, Kijun
Sent: Thursday, May 07, 2015 10:04 AM
To: 'Andrews, Edward S'
Subject: RE: Appalachia Miller Compressor Station Application R13-2831E

Hi Mr. Andrews,
I am still working on getting some of this info but here is what I have so far. Please see responses below.

From: Andrews, Edward S [mailto:Edward.S.Andrews@wv.gov]
Sent: Tuesday, May 05, 2015 12:46 PM
To: Hong, Kijun
Subject: Appalachia Miller Compressor Station Application R13-2831E

Mr. Hong:

I just have a few information requests and several questions concern the Miller.

The application implies that EUCE-1, EUCE-9 through EUCE-11 has already been removed. Is there a forecasted installation date on the new compressor engines? **We do not have a forecasted install date as of yet.**

For EUCE-7 & 8, are the changes to these engines limited to updating the emissions (CO, VOC, PM10, CPM, SO2)? **Yes, this was due to using a more recent fuel analysis. I believe Formaldehyde and total HAPs changed as well.**

Are all of the Caterpillar compressor engines equipped with the EMIT ELH-4200-1616F-4CEE-242 Catalyst? **All the catalysts are different. The listed emit catalyst may or may not be the element that is used. All catalysts will meet or exceed the reductions of the above Emit element.**

For the emission point for the compressor blowdowns, is this emission point an actual vent that all compressor vent to or fugitive emissions within the compressor building? **Each unit has its own blowdown stack.**

Could you provide the ProMax Report that was used to determine the flash emissions from the Storage Tanks? **Attached**

Could you provide the manufacturer's data sheet on the flare, carbon canister adsorption, and the BTEX buster? **Attached**

Were all of the stabilized condensate and pipeline fluids tanks placed into service prior to August 23, 2011? **Yes all were set and started prior to 8-23-11**

Are there any pneumatic controllers located at the facility that was installed after August 23, 2011? **Station uses air to drive pneumatics.**

Should you have any questions about this request or your application, please contact me.

Sincerely,

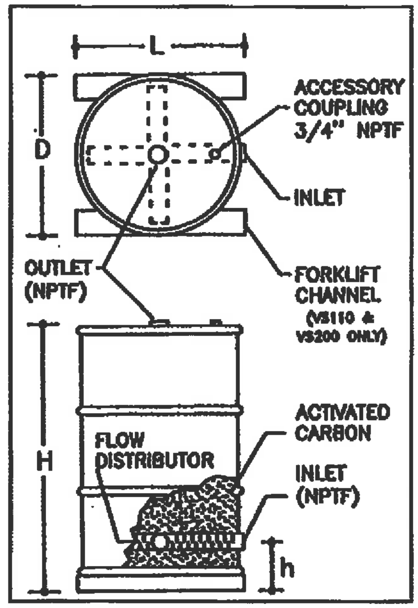
Edward S. Andrews, P.E.
Engineer
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
304.926.0499 ext. 1214

CAMERON GREAT LAKES, INC.

MOLECULAR FILTRATION SPECIALISTS

VAPOR SCRUB

Models VS30-100 - VS55-200 - VS85-300 - VS110-400 - VS200-600



CGL **Vapor Scrub** units, filled with high quality Cameron/Great Lakes activated carbon, are designed for effective purification of your vapor waste or process stream. CGL **Vapor Scrub** units have a proven ability to remove organic contaminants to non-detectable levels.

CGL **Vapor Scrub** units are constructed of heavy-duty mild steel and are lined with double layered epoxy coatings. Forklift channels are provided on the VS110 & VS200 models. Adsorber internals consist of a PVC cross-style inlet flow distributor designed for complete carbon bed use. Upflow operation is standard.

For ease in process maintenance, spent carbon can be removed on site from the vessel by hand or vacuuming out by removing the vessel top head. Alternatively, the spent vessel can be shipped off site for reactivation service or disposal.

(Please contact your nearest CGL office or representative for additional information on disposal and service options.)

SPECIFICATIONS

Model VS	30-100	55-200	85-300	110-400	200-600
H-height, in.	30	36	40	46	51
D-diameter, in.	19	24	26	32	36
L-length, in.	na	na	na	32	36
h-height, in.	4.3	6	5	8	8
Inlet & Outlet Connection, in.	2	2	3	4	6
Flow Range, cfm*	60-100	80-150	110-200	160-300	210-400
Pressure Drop Range, in.w.g.	2.3-6.8	2.7-8.0	3.0-9.0	3.4-10.3	3.0-10.0
Max Pressure, psig	8	8	8	8	8
Max Temp, deg. F	125	125	125	125	125
Carbon Capacity Weight, lbs.	100	200	300	400	600
Volume, cu. ft.	3.9	7.1	10.0	16.1	20
Shipping Weights, lbs	150	270	380	640	1000

2335 NW 29TH AVENUE, PORTLAND, OR 97210
PHONE: (800) 777-4044 FAX: (503) 225-0137
WWW.CAMERONGREATLAKES.COM
EMAIL: SALES@CGLCARBON.COM

CAMERON

WELL SITE MIDSTREAM

NATCO BTEX BUSTER

Removes 99.7%* of BTEX and VOC emissions from glycol reconcentrator emissions

The Simple and Cost-effective Answer to Your Emission Compliance Problems

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Performance

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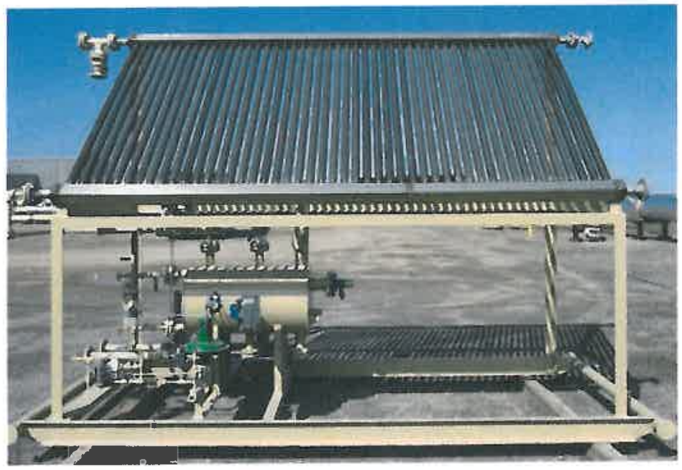

The NATCO BTEX BUSTER cold-weather design eliminates freezing problems associated with cold climates.

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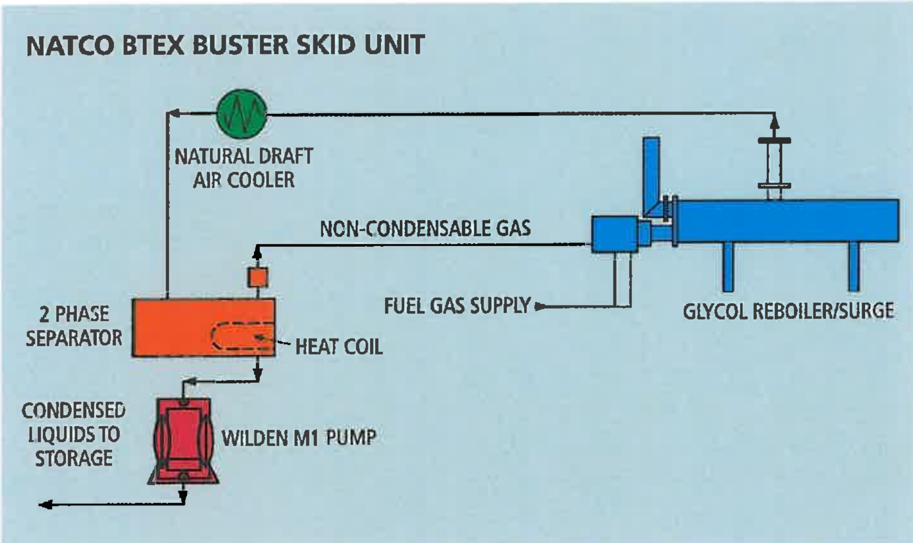
The condensed liquids are collected in a small two-phase separator and pumped to customer storage. Non-condensable gases from the separator are piped through an in-line flash arrestor and then burned in the glycol reboiler firebox to achieve an overall minimum destruction efficiency of 99.7%* plus.

Features	Benefits
Ideal for Remote Locations	Natural draft self-regulating system does not require any moving pieces of equipment.
Environmentally Correct	Meets Federal Regulation 40 CFR part 63 and meets or exceeds most stringent state regulations LAC 111.2116 and LAC 33:111 chapter 51.
Efficient	Removal efficiency is greater than 99.7%*.
Reduces Operating Costs	Reduces fuel gas consumption and recovers saleable liquid hydrocarbons.
Safe	Features an in-line flash arrestor, high-level switch, pressure safety valve and gas shut-down valves.
Designed for the Oil Field	Includes field-proven burner products, and the pneumatic pump handles aromatic hydrocarbons.
Designed for Cold Weather	Cold-weather design eliminates freezing problems associated with cold climates.
Cameron's Services	Includes experienced staff and worldwide locations, 24 hours a day.



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Field-proven, the NATCO BTEX BUSTER now is available through our sales and service locations worldwide.

Standard BTEX Size (1)	Reconcentrator Duty Btu/hr	Glycol Pump gal/hr	Max Capacity water/day (2)	Non-condensable vapor/day (3)	Cooler Duty Btu/hr (3)
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150	150,000	40	273	10	30,000
250	250,000	90	1216	27	51,000
375	375,000	210	1807	45	76,000
550	550,000	210	2650	60	112,000
750	750,000	450	3615	100	152,000

(1) Standard BTEX
Performance of unit is based on a non-condensable vapor HHV greater than 400 Btu/cf and less than 1800 Btu/cf and a glycol circulation rate of no more than 3 gal/lb of water removed.

(2) Maximum Capacity of Water/day
Represents the maximum capacity of water in pounds per day for each of Cameron's standard reboiler size based on a glycol circulation rate of 2 gallons of glycol per pound of water removed.

(3) Non-condensable Vapor/day
Maximum non-condensable vapor rate was calculated with the Gri-Glycalc computer simulation program with a flash-gas separator used in the glycol regeneration process and a BTEX concentration in the inlet gas stream of no more than 700 ppm.
Using adiabatic combustion calculations, a minimum of 99.7%* of these non-condensable vapors are destroyed.

(4) Cooler Duty Btu/hr
Cooler duty was calculated based on a prevailing windspeed of 3 mph and a maximum ambient temperature of 100° F (38° C).

Note: Cameron is not responsible for the disposal of any condensed liquids associated with its BTEX BUSTER units.

* *Certain gas streams contain more BTEX and VOCs than represented by Gri-Glycalc. Consult with Cameron's engineers for system evaluation, equipment sizing and application to ensure conversion efficiency.*

LOCATIONS

United States of America
11210 Equity Dr., Suite 100
Houston, TX 77041
USA
Tel 713.849.7500

Marcellus/Utica
Laceyville 570.869.3104
Nitro 304.755.9400

Midcontinent
Oklahoma City 405.677.8827

Rockies
Casper 307.234.7183
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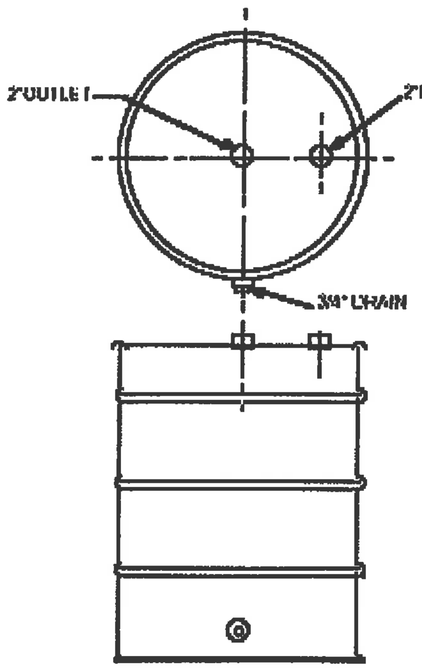
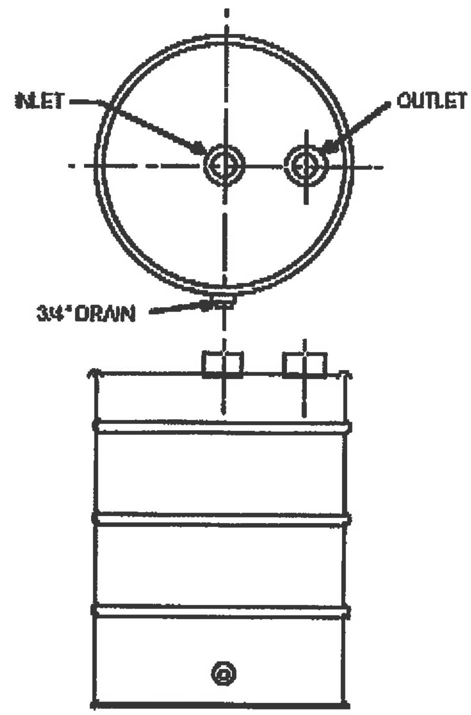


MODEL G-1



MODEL G-2,G-3

SPECIFICATIONS

MODEL	DIAMETER/HEIGHT	CARBON WEIGHT	INLET/OUTLET	MAXIMUM RATED FLOW	APPROXIMATE SHIP WEIGHT
G-1*	24"/36"	200 lbs.	2"/2"	100 CFM	250 lbs.
G-2*	24"/36"	170 lbs.	4"/4"	300 CFM	220 lbs.
G-3P	24"/36"	140 lbs.	6"/6"	500 CFM	190 lbs.
G-3S	24"/34"	140 lbs.	4"/4"	500 CFM	180 lbs.

* Specify: Polyethylene (P) or Epoxy Lined Steel (S)

SAFETY

Certain chemical compounds in the presence of activated carbon may oxidize, decompose or polymerize. This could result in temperature increases sufficient to cause ignition of the activated carbon or adsorbed material. If a compounds reaction with activated carbon is unknown, appropriate tests should be considered.

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G-1
G-2
G-3

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- Low pressure drop.
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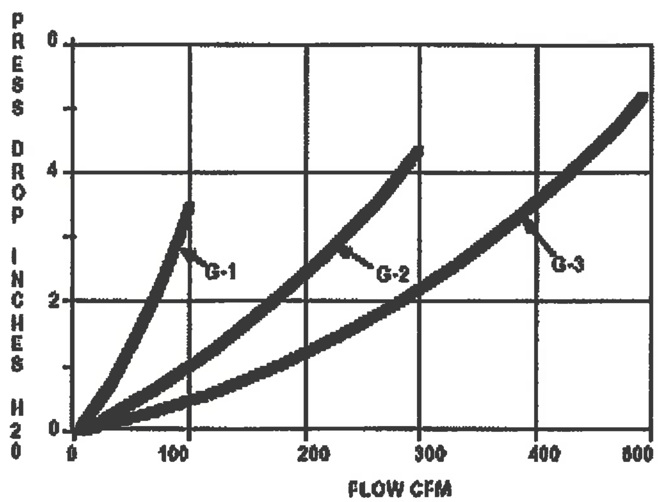
- Air stripper exhausts
- Tank vents
- Exhaust hoods
- Work area purification
- Sewage plant odor control



AT-116/#1

CARBTROL®
CORPORATION

955 Connecticut Ave., Suite 5202
Bridgeport, CT 06607

800-242-1150 Fax: 203-337-4347
www.carbtrol.com info@carbtrol.com

FLARE INDUSTRIES
INNOVATIVE COMBUSTION SOLUTIONS

ENGINEERING PROPOSAL

SAULSBURY E&C
ODESSA, TX

PROJECT

VARIABLE MACH SONIC FLARE SYSTEM

CHESAPEAKE ENERGY
MILLERS STATION
F-1010 PLANT

Prepared for: Brian Futz

Phone No.: (432)366-4252
Email: bfultz@si-tx.com

Sales Contact: Curtis Hanzalik
Regional Sales Manager – Houston & Gulf Coast
Houston, TX
T + 1 (713) 973 5767
F + 1 (713) 973 5768
C + 1 (713) 320 7347
chanzalik@flareindustries.com

Prepared by: José Peña
Applications Engineer
Austin, Texas USA
T +1 (512) 836-9473
F +1 (512) 836-3025
jpena@flareindustries.com

Date: July 1, 2010
Quote No.: 10-0076 R4

FLARE

Design Results and Summary

Quote No.: 10-0076 **Customer:** Saulsbury **Location:** Odessa, TX

Description: Miller Station F-1010 Plant **Prepared by:** JMP

Heptane - Smokeless **Date:** 5/28/2010

AMBIENT CONDITIONS

	USCS		SI	
Ambient Temperature*:	80	°F	27	°C
Wind Speed (Radiation Only):	56	mph	90.12	km/hr
Solar Radiation:	0	Btu/ft^2-hr	0	W/m^2

*Used only in Brzustowski's Radiation Calculation Method

INPUT PARAMETERS

Molecular Weight:	77.02		77.02	
Max. Volumetric Flow Rate*:	14.77	MMSCFD	418,175	m^3/day
Max. Mass Flow Rate:	125,000	lbs/hr	56,699	kg/hr
Inlet Gas Temperature:	250	°F	121	°C
Total Heat Release:	2.43E+09	Btu/Hr	7.12E+05	kW

*Volumetric flow rate is considered at standard conditions.

FLARE TIP CALCULATIONS

Proposed Flare Tip:	10" Mach 1 Sonic Flare			
Flare Tip Diameter:	10	in	254	mm
Exit Velocity:	707	ft/sec	215	m/sec
Pressure Drop of Tip:	23.518	psi	162	kPa

FLARE RISER CALCULATIONS

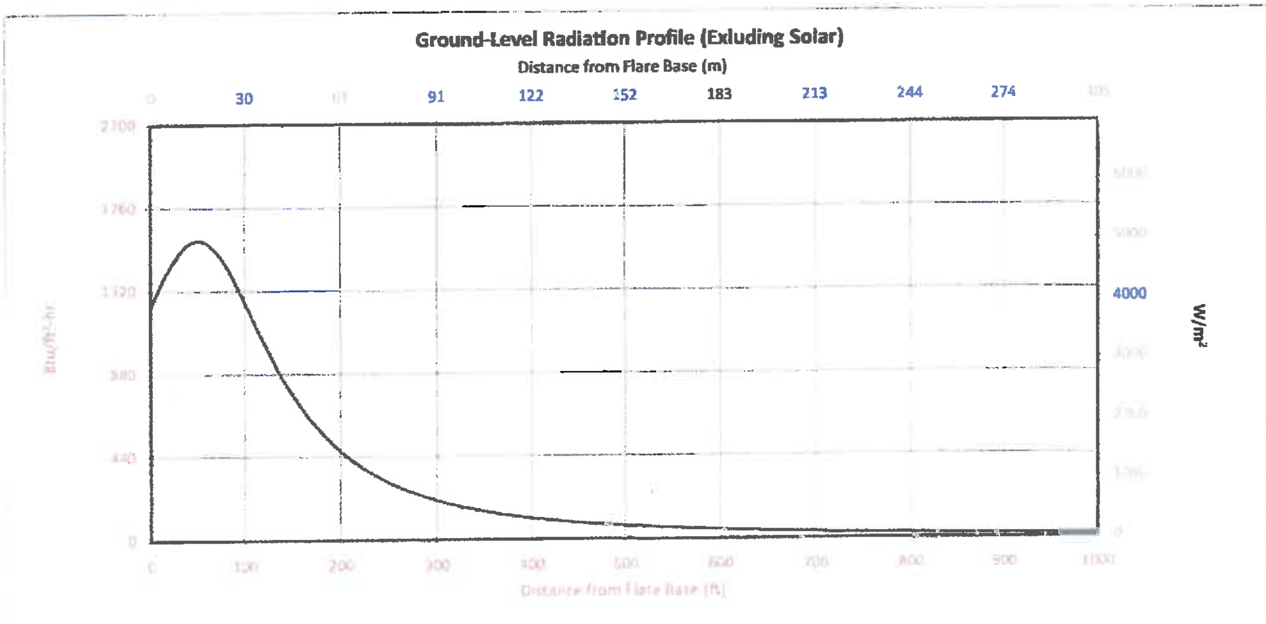
Minimum Flare Height:	70	Ft	21.3	m
Pressure Drop of Inlet and Riser:	1.482	psi	10.2	kPa
Total Pressure Drop of Flare**:	25.000	psi	172.37	kPa

**Includes predicted inlet losses.

RADIATION RESULTS

Maximum Radiation at Grade***:	1,577	Btu/ft^2-hr	4974.4	W/m^2
Solar Radiation Considered:	0	Btu/ft^2-hr	0.0	W/m^2
Distance to Maximum Radiation:	60	ft	18.3	m

***Maximum radiation includes solar radiation



UTILITY FLARE

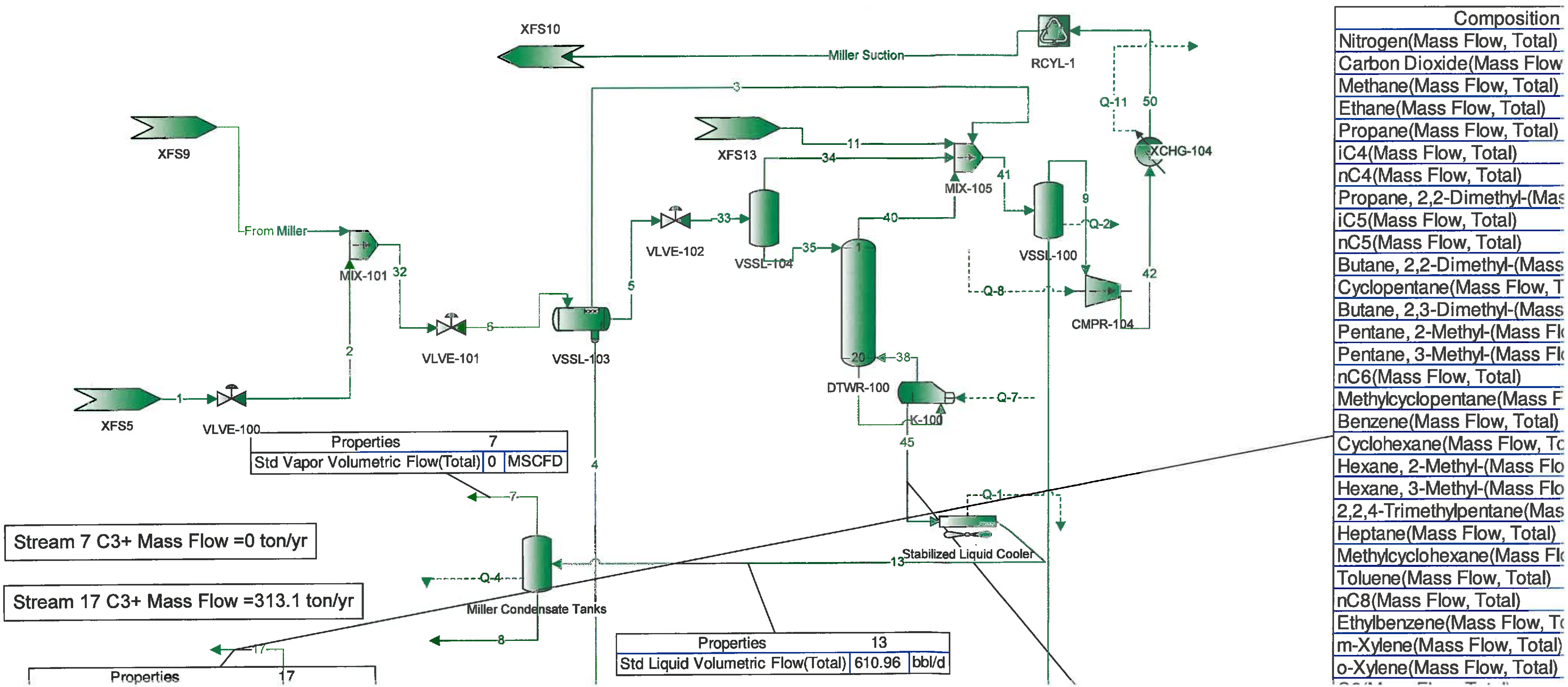
BY: MAH	JOB NO: 6178	PAGE 1 OF 2	SAULSBURY Engineering & Construction
DATE: 5/18/2010	ITEM NO.: F-250		SAULSBURY INDUSTRIES
CUSTOMER: Chesapeake Energy			
PLANT: Millers Station			
SERVICE: Plant Flare			Texas Registered Engineering Firm F-518
QUANTITY: 1	SIZE:		Work by Saulsbury Engineering: rev. no "D"

REV.	DATE	BY	APPR.	NO.	FIRM
Miscellaneous Revisions	5/18/2010	MAH		"C"	SE&C
Design Case Flow	5/18/2010	MAH		"D"	SE&C

	Design Case	Normal Capacity	
Flow Rate, Lb/Hr	0 - 125,000 (Note 2)	0 - 2,000	
Molecular Weight	77.0	29.9	
Temperature, °F	250	120	
Maximum Pressure at Inlet Nozzle, PSIG	15 (Note 1)	15 (Note 1)	
Smokeless Operation Required (Yes/No)	Yes (Note 4)	Yes (Note 4)	
Lower Heating Value, BTU/SCF			
Composition (Mol % / Weight %)	Mol %	Mol %	
Nitrogen	0.00	0.04	
Carbon Dioxide	0.07	0.20	
Methane	2.39	36.19	
Ethane	7.54	37.49	
Propane	12.26	20.03	
Butanes	13.83	4.03	
Pentanes	11.20	1.33	
Heptane	52.71	0.69	
Hydrogen			
Oxygen			
TOTAL	100.00	100.00	

Notes

1. Develop base design to limit pressure at the flare inlet nozzle to 15 psig. A second design may be submitted for consideration with a maximum pressure at the flare inlet nozzle of 25 psig if there is significant economic incentive.
2. Provide maximum hydraulic capacity of the flare at these process conditions.
4. Flare must provide smokeless performance throughout entire range of flow capacity


XFS10
Miller Suction
RCYL-1
Q-11
50
XCHG-104
XFS9
XFS13
11
34
3
MIX-105
41
9
Q-2
VSSL-100
42
From Miller
MIX-101
32
VLVE-102
33
VSSL-104
35
40
DTWR-100
1
20
38
Q-8
CMPR-104
VLVE-101
6
5
VSSL-103
2
XFS5
1
VLVE-100
K-100
Q-7
45
Properties 7
Std Vapor Volumetric Flow(Total) 0 MSCFD
4
7
Q-1
Stabilized Liquid Cooler
13
Stream 7 C3+ Mass Flow =0 ton/yr
Q-4
Miller Condensate Tanks
Stream 17 C3+ Mass Flow =313.1 ton/yr
8
17
Properties 17
Properties 13
Std Liquid Volumetric Flow(Total) 610.96 bbl/d
Composition
Nitrogen(Mass Flow, Total)
Carbon Dioxide(Mass Flow
Methane(Mass Flow, Total)
Ethane(Mass Flow, Total)
Propane(Mass Flow, Total)
iC4(Mass Flow, Total)
nC4(Mass Flow, Total)
Propane, 2,2-Dimethyl-(Mas
iC5(Mass Flow, Total)
nC5(Mass Flow, Total)
Butane, 2,2-Dimethyl-(Mass
Cyclopentane(Mass Flow, T
Butane, 2,3-Dimethyl-(Mass
Pentane, 2-Methyl-(Mass Fl
Pentane, 3-Methyl-(Mass Fl
nC6(Mass Flow, Total)
Methylcyclopentane(Mass F
Benzene(Mass Flow, Total)
Cyclohexane(Mass Flow, To
Hexane, 2-Methyl-(Mass Flo
Hexane, 3-Methyl-(Mass Flo
2,2,4-Trimethylpentane(Mas
Heptane(Mass Flow, Total)
Methylcyclohexane(Mass Fl
Toluene(Mass Flow, Total)
nC8(Mass Flow, Total)
Ethylbenzene(Mass Flow, To
m-Xylene(Mass Flow, Total)
o-Xylene(Mass Flow, Total)

Appalachia
MIDSTREAM SERVICES

RECEIVED
APR 22 2015
WV DEP

April 20, 2015

VIA UPS Overnight

Edward S. Andrews, P.E.
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, L.L.C.
Miller Station - Plant ID No. 051-00130
Application No. R13-2831E

Dear Mr. Andrews:

Appalachia Midstream Services, L.L.C. (AMS) submitted a R13 Permit Modification Application on March 26, 2015, for the Miller 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 Moundsville Daily Echo on April 10, 2015.

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.

NON-CONFIDENTIAL

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

MOUNDSVILLE DAILY ECHO
SINCE 1891

(304) 845-2660
P.O. BOX 369
MOUNDSVILLE
WEST VIRGINIA
26041

AFFIDAVIT OF PUBLICATION

STATE OF WEST VIRGINIA,
COUNTY OF MARSHALL, to wit

I, Melanie S. Murdock being first duly sworn upon my oath, do depose and say:

- that I am Legal Advertising Manager of the MOUNDSVILLE DAILY ECHO, a Republican newspaper;
- that I have been duly authorized to execute this affidavit;
- that such newspaper has been published for over 119 years, Is regularly published afternoons daily except Saturdays and Sundays, for at least fifty weeks during the calendar year, In the municipality of Moundsville, Marshall County, West Virginia.
- that such newspaper is a newspaper of "general circulation" as defined In Art. 3, Chap. 59 of the Code of West Virginia 1931 as amended, within Moundsville and Marshall County;
- that such newspaper averages In length four or more pages, exclusive of any cover, per Issue;
- that such newspaper Is circulated to the general public at a definite price or consideration;
- that such newspaper Is a newspaper to which the general public resorts far passing events of a political, religious, commercial and social nature and for current happenings, announcements, miscellaneous reading matters, advertisements and other notices;
- and that the annexed notice described as follows:

Legal Advertisement

PARTY(ies)

Air Quality Permit Notice / Miller Station

NATURE (and agency if heard before one)

CERTIF-BILL TO

Appalachia Midstream Gas Services
Attn: Kijun Hong
525 Central Park Dr., Ste. 1005
Oklahoma City, OK 73105-1723

WAS PUBLISHED IN-SAID NEWSPAPER AS FOLLOWS

Times	Dates
1	April 10, 2015

BY WORDS	PUBLICATION CHARGES
492	$56.58

(signed) Melanie S Murdock

NOTARIZATION

Taken, sworn and subscribed before me this 4-13th-15

day of April 2015

Amy McGlumphy
Notary Public

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
AMY McGLUMPHY
Moundsville Daily Echo
PO Box 369
Moundsville, WV 26041
My Commission Expires August 2[illegible], 20[illegible]

LEGAL ADVERTISEMENT

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 (WV DEP), Division of Air Quality (DAQ), for a R13 Permit Modification to Permit No. R13-2813D for the Miller Station located in Marshall County, West Virginia.

The facility is located on the Marshall/Wetzel County line near Bannen, WV off of County Road 1/22/ Johnson Ridge with the coordinates 39.7216, -80.6209.

Once the project is complete, the applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx) 77.46 tons/yr
Carbon Monoxide (CO) 88.63 tons/yr
Volatile Organic Compounds (VOC) 74.54 tons/yr
Particulate Matter (PM) 8.83 tons/yr
Sulfur Dioxide (SO2) 1.68 tons/yr
Acetaldehyde 0.92 tons/yr
Acrolein 0.67 tons/yr
Benzene 0.59 tons/yr
Ethylbenzene 0.07 tons/yr
Formaldehyde 9.96 tons/yr
Methanol 0.53 tons/yr
n-Hexane 0.85 tons/yr
Toluene 0.96 tons/yr
Xylenes 0.63 tons/yr

The application is being submitted to authorize:

- Remove one (1) 1,380-hp Waukesha L5794 GSI compressor engine (EPCE-1)
- Replace three (3) 1,380-hp Caterpillar G3516B compressor engines (EPCE-9, EPCE-10, and EPCE-11) with like-kind engines
- Add (1) one 1,380-hp Caterpillar G3516B compressor engine (EPCE-12)

Andrews, Edward S

From: Adkins, Sandra K
Sent: Monday, April 06, 2015 11:54 AM
To: Andrews, Edward S
Subject: Appalachia Midstream Services (Miller Station)/Permit Application Fee

This is the receipt for payment received from:

Appalachia Midstream Services, check number 3390055076, dated March 25, 2015, $2,000.00
Miller Station R13-2831E id no 051-00130

OASIS Deposit No CR 1500110185 April 6, 2015

Entire Document
NON-CONFIDENTIAL

From:	Rice, Jennifer L
Sent:	Monday, April 06, 2015 10:37 AM
To:	airgroup@williams.com; randy.delaune@williams.com
Cc:	Andrews, Edward S; McKeone, Beverly D
Subject:	WV DAQ Permit Application Status for Appalachia Midsream Services; Miller Station

RE: Application Status
Appalachia Midstream Services LLC
Miller Station
Plant ID No. 051-00130
Application No. R13-2831E

Mr. DeLaune,

Your application for a modification permit for the Miller Station was received by this Division on April 1, 2015, and was assigned to Ed Andrews. The following item was not included in the initial application submittal:

Original affidavit for Class I legal advertisement not submitted.
***Legal ad must be republished to include the facility latitude & longitude.**

This item is necessary for the assigned permit writer to continue the 30-day completeness review.

Within 30 days, you should receive a letter from Ed Andrews stating the status of the permit application and, if complete, given an estimated time frame for the agency's final action on the permit.

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

Should you have any questions, please contact the assigned engineer, Ed Andrews, at 304-926-0499, extension 1214.

Jennifer Rice
WV Dept. of Environmental Protection
Division of Air Quality

Entire Document
NON-CONFIDENTIAL

Appalachia
MIDSTREAM SERVICES

March 26, 2015

RECEIVED
APR - 1 2015
WV DEP
DIVISION OF AIR QUALITY

VIA UPS

Mr. John Benedict, Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, WV 25304

Re: Appalachia Midstream Services, L.L.C.
Miller Station
R13 Permit Modification Application
Permit No. R13-2831D
Plant ID No. 051-00130

ID # 51-130
Reg R13-2831E
Company AMS
Facility Miller C.S. Initials SK

Dear Mr. Benedict:

Appalachia Midstream Services, L.L.C. (AMS), is authorization to operate the Miller Station in Marshall County under the above-referenced permit. With this application and in accordance with the West Virginia Air Pollution Control Act and Title 45 Series 13 (45CSR13), AMS requests to modify the current permit as follows:

- Remove one (1) 1,380-hp Waukesha L5794 GSI compressor engine (EPCE-1)
- Replace three (3) 1,380-hp Caterpillar G3516B compressor engines (EPCE-9, EPCE-10, and EPCE-11) with like-kind engines
- Add (1) one 1,380-hp Caterpillar G3516B compressor engine (EPCE-12)
- Add compressor blowdown emissions (EP-BD)
- Revise facility emissions from miscellaneous sources (EPCE-2 – EPCE-11, EPDHY-1 – EPDHY-3, EPREBL-1 – EPREBL-3, EPOH-1, and EP-FUG) using an updated gas analysis
- Revise greenhouse gas emissions using the current Global Warming Potential multipliers.

Entire Document
NON-CONFIDENTIAL

Appalachia Midstream Services, L.L.C.
P.O. Box 54382
Oklahoma City, OK 73154-1382

The enclosed package contains the required application forms, emissions calculations and supporting documentation for the referenced project. A check in the amount $2,000 is also enclosed for the application and 45CSR22 fees. The public notice for the proposed construction will be published in *Moundsville Daily Echo*. AMS will forward the Affidavit of Publication to your attention once it is received from the publisher.

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

Enclosure(s) – Original + Two Copies

APPALACHIA MIDSTREAM SERVICES, L.L.C.

MILLER COMPRESSOR STATION

MODIFICATION APPLICATION

SUBMITTED TO WVDEP DIVISION OF AIR QUALITY
MARCH 2015

TABLE OF CONTENTS

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

Company:	Appalachia Midstream Services, LLC			**Facility:**	Miller Station
Region:		**Plant ID:**	051-00130	**Application #:**	13-2831E
Engineer:	Andrews, Edward S.			**Category:**	
Physical Address:	CR 1/22 Johnson Ridge Rd Miller Station Cameron WV 26033			SIC: [1311] OIL AND GAS EXTRACTION - CRUDE PETROLEUM & NATURAL GAS NAICS: [211111] Crude Petroleum and Natural Gas Extraction SIC: [4923] ELECTRIC, GAS AND SANITARY SERVICES - GAS TRANSMISSION AND DISTRIBUTION NAICS: [221210] Natural Gas Distribution	
County:	Marshall				
Other Parties:	Gen_Mgr - DeLaune, Randy 405-935-6159				

Information Needed for Database and AIRS
No required information is missing.

Regulated Pollutants

Summary from this Permit 13-2831E		
Air Programs		**Applicable Regulations**
Fee Program	**Fee**	**Application Type**
	$2,000.00	MODIFICATION

Notes from Database

Activity Dates

APPLICATION RECIEVED	04/01/2015
APPLICATION FEE PAID	04/06/2015
ASSIGNED DATE	04/06/2015

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: 051-00130
Company: Appalachia Midstream Services,
Printed: 04/06/2015
Engineer: Andrews, Edward S.

051-00130 Modif.
R13-2831E Ed

45CSR13 Administrative Update, Construction, Modification, Relocation, Temporary Permit or General Permit Registration Incomplete Application

A complete application is demonstrated when all of the information required below is properly prepared, completed and attached. The items listed below are required information which must be submitted with a 45CSR13 permit application. Any submittal will be considered incomplete if the required information is not included. The applicant must submit a complete application in order to receive a 45CSR13 permit.

☒ Class I legal advertisement not published in a newspaper certified to accept legal advertisements and original affidavit submitted. Legal Ad must include GPS Coordinates, Please republish

☐ Application fee AND/OR additional application fees not included:
- ☐ $250 Class I General Permit
- ☐ $300 Class II Administrative Update
- ☐ $1,000 Construction, Modification, Relocation or Temporary Permit
- ☐ $500 Class II General Permit
- ☐ $1,000 NSPS
- ☐ $2,500 NESHAP
- ☐ $2,500 45CSR27 Pollutant
- ☐ $5,000 Major Modification
- ☐ $10,000 Major Construction

☐ Original and two (2) copies of the application not submitted.

☐ File organization – application pages are not numbered or in correct order, application is not bound in some way, etc.

☐ Confidential Business Information is not properly identified.

☐ General application forms not completed and signed by a responsible official.

☐ Authority of Corporation form not included – required if application is signed by someone other than a responsible official.

☐ Applicant is not registered with the West Virginia Secretary of State's Office.

☐ Copy of current Business Registration Certificate not included.

☐ Process description, including equipment and emission point identification numbers, not submitted.

☐ Process flow diagram, including equipment and emission point identification numbers, not submitted.

☐ Plot plan, including equipment and emission point identification numbers, not submitted.

☐ Applicable technical forms not completed and submitted:
- ☐ Emission Point Data Summary Sheets
- ☐ Emission Unit Data Sheets
- ☐ Air Pollution Control Device Sheets
- ☐ Equipment List Form

☐ Emission calculations not included – emission factors, references, source identification numbers, etc.

☐ Electronic submittal diskette not included.

304-926-0499 x1227
Jennifer.L.Rice@wv.gov

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):* **Miller 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: **On the border of the Marshall/Wetzel County line near Bannen, WV**

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: **211111**
11A. DAQ Plant ID No. (for existing facilities only): **051-00130**	11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): **R13-2831D**

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 Bannen, head southwest on Amos Hollow Road/County Road 89 toward Clark Hill for 1.1 miles.**
- **Turn left at Laurel Run. In 0.8 miles, turn right to stay on Laurel Run.**
- **In 0.4 miles, take slight left at Johnson Hill.**
- **Take the first left onto County Road 1/22/Johnson Ridge.**

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
N/A	**Bannen**	**Marshall**
12.E. UTM Northing (KM): **4396.730**	12F. UTM Easting (KM): **532.478**	12G. UTM Zone: **17**

13. Briefly describe the proposed change(s) at the facility:
AMS requests to remove one (1) 1,380-hp Waukesha L5794 GSI compressor engine (EPCE-1), replace three (3) 1,380-hp Caterpillar G3516B compressor engines (EPCE-9, EPCE-10, and EPCE-11) with like-kind engines, add (1) one 1,380-hp Caterpillar G3516B compressor engine (EPCE-12), add compressor blowdown emissions (BD), revise facility emissions from miscellaneous sources (EPCE-2 – EPCE-11, EPDHY-1 – EPDHY-3, EPREBL-1 – EPREBL-3, EPOH-1, and EP-FUG) using an updated gas analysis, and revise greenhouse gas emissions using the current Global Warming Potential multipliers.

14A. Provide the date of anticipated installation or change: **Upon approval** – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: **Upon approval**

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).

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

☒ General Emission Unit, specify : Compressor Engines and Dehydrators

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
☐ Adsorption Systems
☐ Afterburner
☐ Baghouse
☒ Condenser
☐ Electrostatic Precipitator
☐ Flare
☐ Mechanical Collector
☐ 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 Governmental Agency
☐ Authority of Partnership
☐ 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 Randy C DeLaune *(Please use blue ink)* DATE: 3/24/15 *(Please use blue ink)*

35B. Printed name of signee: **Randy DeLaune**		35C. Title: **General Manager**
35D. E-mail: **Randy.Delaune@williams.com**	36E. Phone: **405-727-1235**	36F. FAX: **405-727-3235**
36A. Printed name of contact person (if different from above): **Kijun Hong**		36B. Title: **Specialist - Air**
36C. E-mail: **airgroup@williams.com**	36D. Phone: **405-727-1245**	36E. FAX: **405-727-3245**

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.

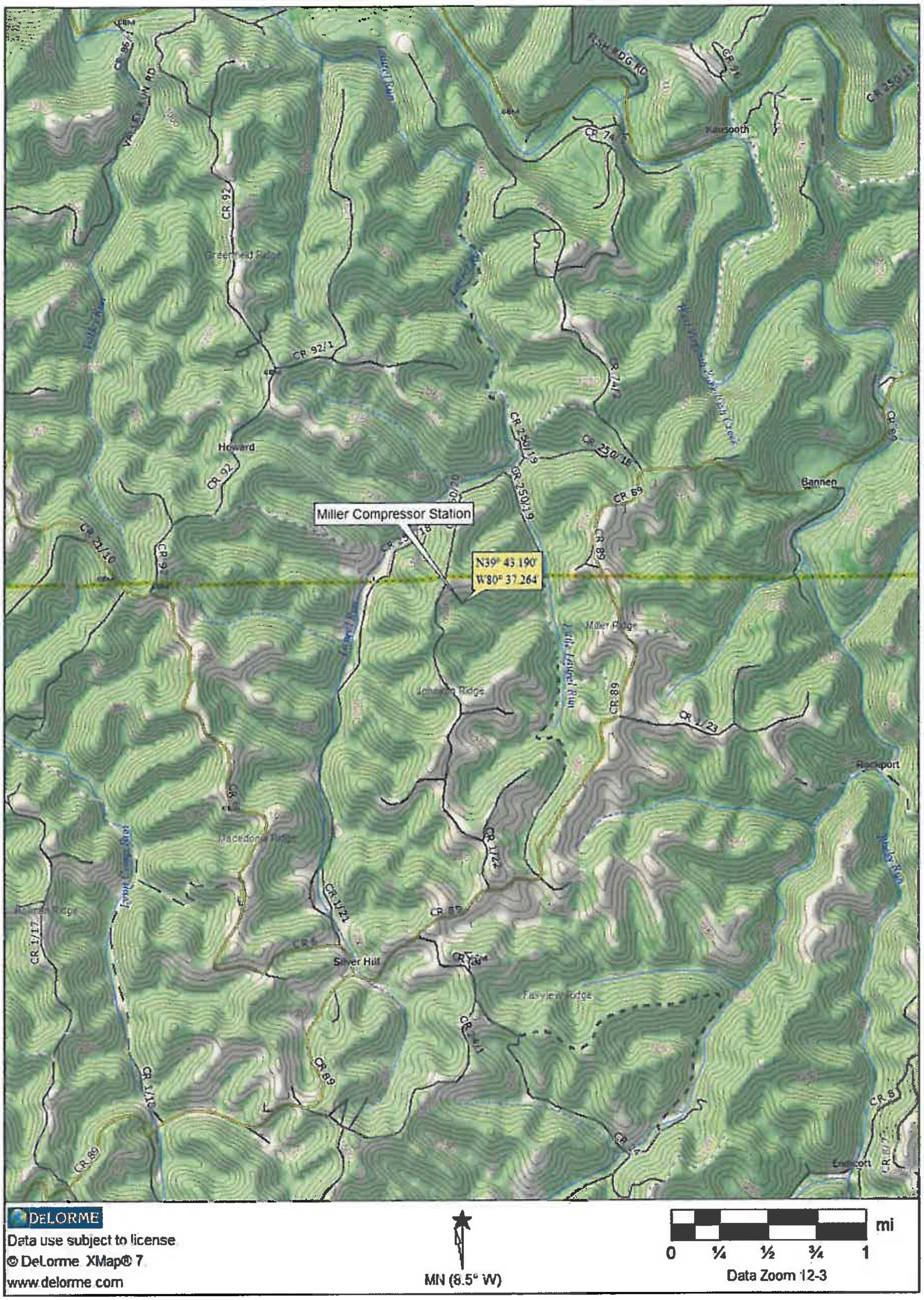
This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

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



Miller Compressor Station
Figure 1: Area Map
Marshall County, WV
March 2015

ATTACHMENT C: INSTALLATION/START-UP SCHEDULE

The final dates of installation and start-up of the proposed equipment are contingent upon the permit issuance date.

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:

The change in potential emissions associated with the proposed 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. This facility was subject to this subpart based on the Joule-Thomson (JT) system; however, the system has been removed and this subpart no longer applies.

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 Waukesha L5794 GSI units are four-stroke, rich-burn natural gas-fired compressor engines that were manufactured after July 1, 2007 and are therefore subject to Stage 1 emissions standards in this subpart. The 1,380-hp Caterpillar G3516B units are four-stroke, lean-burn natural gas-fired compressor 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 generators have a heat input less than 10 mmBtu/hr and are therefore not subject to this subpart.

40 CFR PART 60 SUBPART OOOO – STANDARDS OF PERFORMANCE FOR THE OIL AND GAS SECTOR:

This subpart regulates VOC and SO_2 emissions for certain parts of oil and gas operations, including pneumatic controllers, reciprocating compressors, centrifugal compressors, storage vessel, processing plants, and sweetening units. No centrifugal compressors, processing plants or sweetening units will be used at this site. The storage vessels will have controlled emissions less than 6 tpy each and will not be subject. Pneumatic controllers and reciprocating compressors will comply with the manufacturer standards and workplace requirements as applicable.

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 will remain a minor (area) source of hazardous air pollutants. Even though the TEG dehydration units at this facility are considered affected sources, they are 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 are 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.

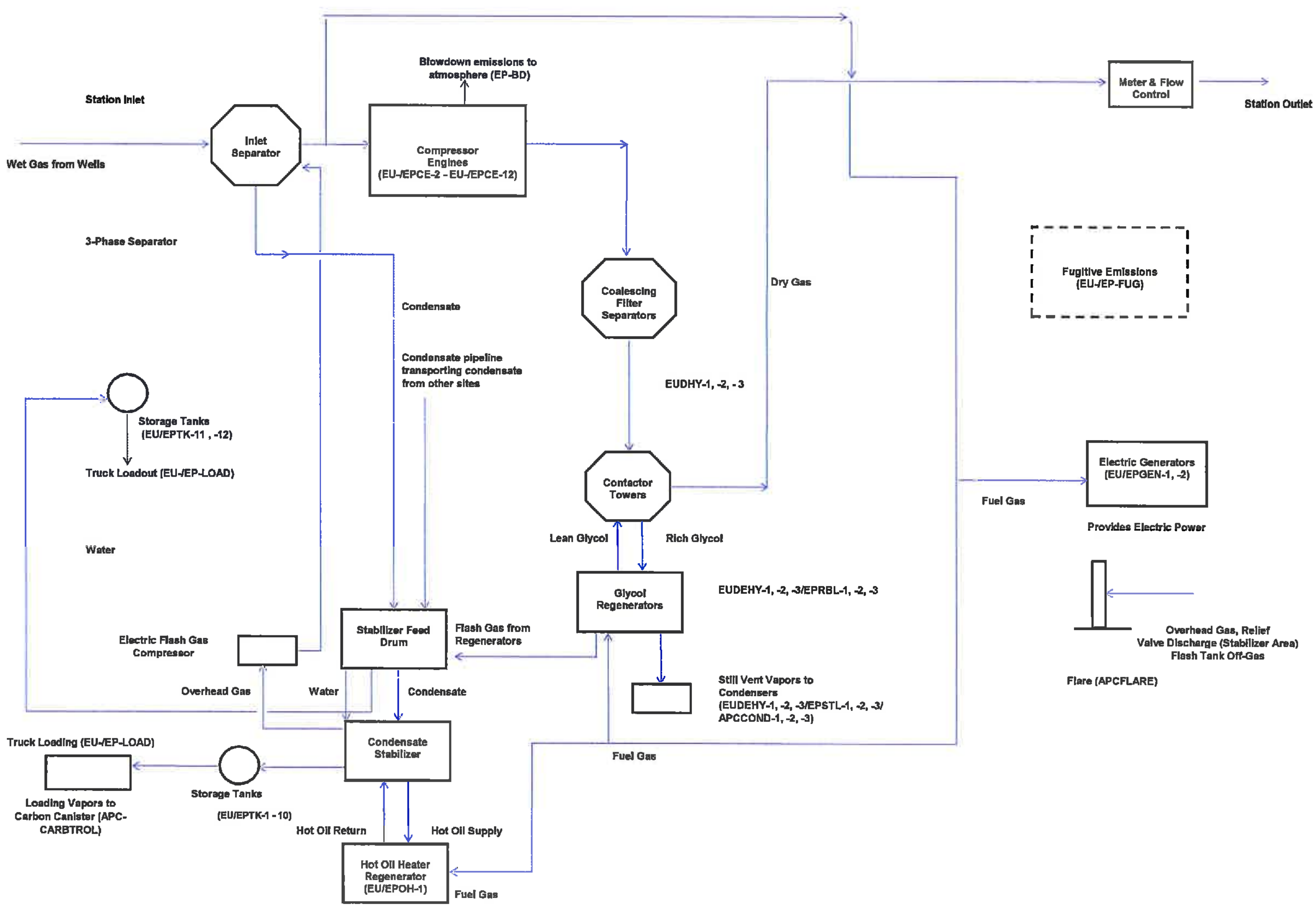
40 CFR PART 63 SUBPART ZZZZ - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES FROM STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES - AREA SOURCE:

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, rich-burn natural gas-fired compressor engines commenced construction after the June 12, 2006 effective date for new stationary RICE at area sources and are therefore subject to this subpart. The 1,380-hp, four-stroke, lean-burn natural gas-fired compressor engines also commenced construction after the June 12, 2006 effective date for new stationary RICE at area sources and are also subject to this subpart. The engines will meet requirements by compliance with Subpart JJJJ. No further requirements apply for these engines under this subpart.

ATTACHMENT F: PROCESS FLOW DIAGRAM

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Figure 2. Process Flow Diagram



ATTACHMENT H: MATERIAL SAFETY DATA SHEETS (MSDS)

Note: MSDS are representative of but not necessarily identical to materials used and/or processed at facility.

Material Safety Data Sheet

Health	1
Flammability	4
Reactivity	0
PPE	

Material Name: Natural Gas

* * * Section 1 - Chemical Product and Company Identification * * *

Product name: Natural Gas
Synonyms: Wellhead Gas; Petroleum Gas; Fuel Gas; Methane; Marsh Gas
Chemical Family: Petroleum Hydrocarbon
Formula: Gas mixture, primarily methane

Supplier: Chesapeake Energy Corporation and its subsidiaries
6100 N. Western Avenue
Oklahoma City, OK 73118

Other Information: Phone: 405-848-8000 Fax: 405-753-5468
Emergency Phone Number: Chemtrec – 800-424-9300

* * * Section 2 - Hazards Identification * * *

Emergency Overview

Flammable gas, simple asphyxiant, freeze burns can occur from liquid natural gas. Keep away from heat, sparks, flames, static electricity, or other sources of ignition.

Potential Health Effects: Eyes

Natural gas is generally non-irritating to the eyes. Liquid or expanding gas can cause severe freeze burns to the eye and surrounding tissue. Pressurized gas can cause mechanical injury to the eye.

Potential Health Effects: Skin

None for gas; liquid or expanding gas can cause severe freeze burns on the skin.

Potential Health Effects: Ingestion

This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Potential Health Effects: Inhalation

Drowsiness, excitation, or mild narcosis is produced at elevated concentrations and is an asphyxiant when the oxygen concentration falls below 18% at sea level.

HMIS Ratings: Health: 1 Fire: 4 HMIS Reactivity 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent Ranges
8006-14-2	Natural Gas	100
74-82-8	Methane	>90
74-84-0	Ethane	<5
74-98-6	Propane	<1
Mixture	C4-C6 Aliphatic Hydrocarbons	Trace amounts

This product may contain small amounts of heavier hydrocarbons. Components of this product are normally within the ranges listed above; however, depending on the geographical source, gas composition may vary.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Move away from exposure to vapors and into fresh air. If liquefied gas contacts the eye, flush with large amounts of tepid water for at least 15 minutes. Seek medical attention.

First Aid: Skin

Treat burned or frostbitten skin by immersing the affected area in tepid water. When sensation has returned to the frostbitten skin, keep the skin warm, dry, and clean. For burns, lay bulky, dry sterile bandages over affected area and seek prompt medical attention.

First Aid: Ingestion

Not considered likely since the product is a gas under normal conditions.

First Aid: Inhalation

If conditions are safe to do so, remove affected person to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration or cardiopulmonary resuscitation (CPR). Seek immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

This gas is extremely flammable and forms flammable mixtures with air. It will burn in the open or be explosive in confined spaces. Its vapors are lighter than air and will disperse. A hazard of re-ignition or explosion exists if flame is extinguished without stopping the flow of gas.

Hazardous Combustion Products

Combustion may yield carbon monoxide and/or carbon dioxide.

Extinguishing Media

Stop the gas flow if it can be done without risk. Dry chemical, carbon dioxide, or halon. Water can be used to cool the fire but may not extinguish the fire.

Fire Fighting Equipment/Instructions

Evacuate the area upwind of the source. If a leak or spill has not ignited, water spray can be used to disperse gas and to protect persons attempting to stop the leak. In the case of a fire, control the fire until the gas supply can be shut off. If the gas source cannot be shut off immediately, equipment and surfaces exposed to the fire should be cooled with water to prevent overheating and explosions. Firefighters should wear self-contained breathing apparatus and full protective clothing.

NFPA Ratings: Health: 1 **Fire:** 4 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

* * * Section 6 - Accidental Release Measures * * *

Containment Procedures

Flammable Gas – Eliminate All Sources of Ignition. Stop release/spill if it can be done with minimal risk. Keep all sources of ignition and hot metal surfaces away from release/spill. The use of explosion-proof equipment is recommended.

Evacuation Procedures

Notify persons down wind of the release/spill, isolate the immediate hazard area and keep unauthorized personnel out. Contact fire authorities and appropriate state/local agencies.

Special Procedures

Eliminate sources of heat or ignition including internal combustion engines and power tools. Stay up wind and away from the release/spill. Wear appropriate protective equipment including respiratory protection as conditions warrant.

* * * Section 7 - Handling and Storage * * *

Store and use natural gas cylinders and tanks in well ventilated areas, away from direct sunlight and sources of ignition. Keep away from heat, sparks, open flames, and other sources of ignition. Rapid escape of gas may generate static charge. Electrically ground and bond all lines and equipment used with natural gas. Use only explosion-proof or intrinsically safe electrical equipment where product is stored or handled. Keep away from incompatible agents and from cylinders of oxygen.

* * * Section 8 - Exposure Controls / Personal Protection * * *

A: Component Exposure Limits

Natural Gas (8006-14-2)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)

Methane (74-82-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)

Ethane (74-84-0)
ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)

Propane (74-98-6)
ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)
OSHA: 1000 ppm TWA; 1800 mg/m^3 TWA
NIOSH: 1000 ppm TWA; 1800 mg/m^3 TWA

Engineering Controls
Local or general exhaust is required if used in an enclosed area in order to keep concentrations below the lower explosive limit.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face
Eye protection should be worn to safeguard against potential eye contact, irritation, or injury.

Personal Protective Equipment: Skin
Protect skin from contact. Impervious clothing should be worn as needed.

Personal Protective Equipment: Respiratory
Use approved respiratory protective equipment in the event of oxygen deficiency, when the product produces vapors that exceed permissible limits or when excessive vapors are generated. Self-contained breathing apparatus should be used for fire fighting.

Personal Protective Equipment: General
Do not smoke in areas where this product is stored or handled. A source of clean water should be available in the work area for flushing eyes and skin. Use explosion-proof equipment suitable for hazardous locations.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Colorless	**Odor:**	Odorless to slight hydrocarbon
Physical State:	Gas	**pH:**	Neutral
Vapor Pressure:	>760 @ 25°C	**Vapor Density:**	0.6 (estimate)
Boiling Point:	-258 to -43°F	**Melting Point:**	NA
Solubility (H2O):	Slight	**Specific Gravity:**	0.55 (estimate)
Evaporation Rate:	Gas under normal conditions	**VOC:**	100%
Octanol/H2O Coeff.:	NA	**Flash Point:**	Flammable gas
Flash Point Method:	NA	**Upper Flammability Limit (UFL):**	15.0
		Lower Flammability Limit (LFL):	4.0
		Burning Rate:	Flammable gas
		Auto Ignition:	900 – 1170 °F

Properties of this material will vary with actual composition.

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability
This material is stable under normal conditions of use.

Chemical Stability: Conditions to Avoid
Sources of heat or ignition.

Incompatibility
Strong oxidizers such as nitrates, chlorates, peroxides.

Hazardous Decomposition
Combustion produces carbon monoxide and carbon dioxide.

Possibility of Hazardous Reactions
Will not occur.

*** Section 11 - Toxicological Information ***

Acute Dose Effects

Component Analysis - LD50/LC50

Natural gas (8006-14-2)
Inhalation LC50 Rat: 658 mg/L/4H

Methane (74-82-8)
Inhalation LC50 Mouse: 326 g/m3/2H

Ethane (74-84-0)
Inhalation LC50 Rat: 658 mg/L/4H

Propane (74-98-6)
Inhalation LC50 Rat: 658 mg/L/4H

The major components of natural gas act as simple asphyxiant gases without significant potential for systemic toxicity. At high concentrations this material acts as an asphyxiant by diluting and displacing oxygen. Extremely high concentrations of this material can produce unconsciousness followed by death. Symptoms of persons exposed to oxygen deficient atmospheres include headache, dizziness, incoordination, cyanosis and narcosis.

*** Section 12 - Ecological Information ***

There is no information available on the ecotoxicological effects of petroleum gases. Because of their high volatility, these gases are unlikely to cause ground or water pollution. Petroleum gases released into the environment will rapidly disperse into the atmosphere and undergo photochemical degradation.

*** Section 13 - Disposal Considerations ***

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of in containers, it may meet the criteria of an "ignitable" waste. It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Natural Gas, Compressed
UN/NA #: 1271 **Hazard Class:** 2.1 **Packing Group:** Not applicable

Depending on the product's properties the shipper may elect to classify the material differently. Refer to 49 CFR 172 for further information and descriptions.

*** Section 15 - Regulatory Information ***

US Federal Regulations

Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Natural gas	8006-14-2	No	Yes	No	No	Yes	No
Methane	74-82-8	No	Yes	Yes	Yes	Yes	Yes
Ethane	74-84-0	No	Yes	Yes	Yes	Yes	Yes
Propane	74-98-6	No	Yes	Yes	Yes	Yes	Yes

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Natural gas	8006-14-2	Yes	DSL	EINECS
Methane	74-82-8	Yes	DSL	EINECS
Ethane	74-84-0	Yes	DSL	EINECS
Propane	74-98-6	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Other Information

The information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Key/Legend

NA - Not Applicable
ND - Not Determined
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
RQ - Reportable Quantity
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer

Health	1
Flammability	4
Reactivity	0
PPE	

Material Safety Data Sheet

Material Name: Natural Gas Condensate

* * * Section 1 - Chemical Product and Company Identification * * *

Product name: Natural Gas Condensate

Synonyms: Drips; Condensate; Field Condensate; Gas Well Condensate; High Pressure Inlet Liquids; Lease Condensate; Natural Gas Liquids (NGL or NGLs); Pipeline Liquids

Chemical Family: Petroleum Hydrocarbon

Formula: Complex mixture

Supplier: Chesapeake Energy Corporation and its subsidiaries
6100 N. Western Avenue
Oklahoma City, OK 73118

Other Information: Phone: 405-848-8000 Fax: 405-753-5468

Emergency Phone Number: Chemtrec – 800-424-9300

* * * Section 2 - Hazards Identification * * *

Emergency Overview

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources. Contact may cause eye, skin and mucous membrane irritation. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headaches, intoxication), and respiratory system effects. If ingested, do NOT induce vomiting as this may cause chemical pneumonia (fluid in the lungs).May contain benzene which can cause blood disease including anemia and leukemia.

Potential Health Effects: Eyes

May cause moderate irritation.

Potential Health Effects: Skin

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

Potential Health Effects: Ingestion

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death. Contains carbon dioxide, which can produce rapid breathing, fatigue, muscular incoordination, nausea, and asphyxiation depending on the concentration and duration of exposure.

Medical Conditions Aggravated by Exposure

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

HMIS Ratings: Health: 1 **Fire:** 4 **HMIS Reactivity** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent Ranges
68919-39-1	Natural gas condensate	100
71-43-2	Benzene	0.1-2

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Seek medical attention. Monitor for breathing difficulty.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

NFPA Ratings: Health: 1 **Fire:** 4 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Product may release substantial amounts of flammable vapors and gases (e.g., methane, ethane, and propane), at or below ambient temperature depending on source and process conditions and pressure.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection - do not discharge solid water stream patterns into the liquid resulting in splashing.

Clean-Up Procedures

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment.

Evacuation Procedures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible.

Special Procedures

Avoid excessive skin contact with the spilled material.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

* * * Section 8 - Exposure Controls / Personal Protection * * *

A: Component Exposure Limits

Benzene (71-43-2)

ACGIH:	0.5 ppm TWA
	2.5 ppm STEL
	Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA:	10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH:	0.1 ppm TWA
	1 ppm STEL

Engineering Controls

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as of E.I. DuPont Tyvek-Saranex 23 ®, Tychem®, Barricade® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

Personal Protective Equipment: Respiratory

A NIOSH -approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: General

Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	A colorless to straw-yellow, water-like	**Odor:**	Petroleum
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	~110 psia @ 100°F	**Vapor Density:**	>1
Boiling Point:	85 to 437°F (39 to 200°C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	AP 0.62 - 0.76
Evaporation Rate:	High	**VOC:**	ND
Percent Volatile:	100	**Octanol/H2O Coeff.:**	ND
Flash Point:	AP -40°F / <-40°C	**Flash Point Method:**	TCC
		Lower Flammability Limit (LFL):	ND
		Upper Flammability Limit (UFL):	ND
		Burning Rate:	ND
		Auto Ignition:	480°F / 250°C

- * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Stable under normal ambient and anticipated conditions of storage and handling. Extremely flammable liquid and vapor. Vapor can cause flash fire.

Chemical Stability: Conditions to Avoid

Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Incompatibility

Keep away from strong oxidizers

Hazardous Decomposition

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Possibility of Hazardous Reactions

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute Dose Effects

Component Analysis - LD50/LC50

Natural gas condensate (68919-39-1)

Inhalation LC50 Rat: >5.2 mg/L/4H; Oral LD50 Rat: 14000 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

Benzene (71-43-2)

Inhalation LC50 Rat: 13050-14380 ppm/4H; Oral LD50 Rat:1800 mg/kg

Carcinogenicity

Component Carcinogenicity

Benzene (71-43-2)

ACGIH:	A1 - Confirmed Human Carcinogen
OSHA:	10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH:	potential occupational carcinogen
NTP:	Known Human Carcinogen (Select Carcinogen)
IARC:	Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

* * * Section 12 - Ecological Information * * *

Ecotoxicity

Component Analysis - Ecotoxicity - Aquatic Toxicity

Natural gas condensate (68919-39-1)

Test & Species		Conditions
96 Hr LC50 Alburnus alburnus	119 mg/L [static]	
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]	
72 Hr EC50 Selenastrum capricornutum	56 mg/L	
24 Hr EC50 Daphnia magna	170 mg/L	

Benzene (71-43-2)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	12.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	22 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]	
72 Hr EC50 Selenastrum capricornutum	29 mg/L	
48 Hr EC50 water flea	356 mg/L [Static]	
48 Hr EC50 Daphnia magna	10 mg/L	

* * * Section 13 - Disposal Considerations * * *

US EPA Waste Number & Descriptions

A: General Product Information

Wastes must be tested using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes.

B: Component Waste Numbers

Benzene (71-43-2)

RCRA: waste number U019 (Ignitable waste, Toxic waste)
0.5 mg/L regulatory level

Disposal Instructions

All wastes must be handled in accordance with local, state and federal regulations.
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

* * * Section 14 - Transportation Information * * *

US DOT Information

Shipping Name: Petroleum distillates, n.o.s or Petroleum products, n.o.s. (condensate)
UN/NA #: 1268 **Hazard Class:** 3 **Packing Group:** II

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

Component Analysis

This material may contain one of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration

CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Benzene	71-43-2	0.1 %

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Natural gas condensate	68919-39-1	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS

*** Section 16 - Other Information ***

Other Information

The information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Key/Legend

NA - Not Applicable
ND - Not Determined
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
RQ - Reportable Quantity
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer

Health	1
Flammability	4
Reactivity	0
PPE	

Material Safety Data Sheet

Material Name: Produced Water

* * * Section 1 - Chemical Product and Company Identification * * *

Product name: Produced Water - Sweet
Synonyms: Salt Water, H_2O, Oily Water, Formation Water
Chemical Family: Water
Formula: Complex mixture

Supplier: Chesapeake Energy Corporation and its subsidiaries
6100 N. Western Avenue
Oklahoma City, OK 73118

Other Information: Phone: 405-848-8000 Fax: 405-753-5468
Emergency Phone Number: Chemtrec – 800-424-9300

* * * Section 2 - Hazards Identification * * *

Emergency Overview
May cause eye, skin, respiratory and gastrointestinal tract irritation.
Potential Health Effects: Eyes
May cause eye irritation.
Potential Health Effects: Skin
Contact may cause skin irritation.
Potential Health Effects: Ingestion
Ingestion may cause irritation of the digestive tract that may result in nausea, vomiting and diarrhea.
Potential Health Effects: Inhalation
Breathing the mist and vapors may be irritating to the respiratory tract.
HMIS Ratings: Health: 1 **Fire:** 4 **HMIS Reactivity** 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 3 - Composition / Information on Ingredients * * *

Produced water is a mixture of varying amounts of water and oil produced from various exploration and production processes. Produced water may contain an upper layer of flammable liquid and vapor hydrocarbons. Produced water may include small amounts of natural gas condensate, and benzene may be present.

CAS #	Component	Percent
7732-18-5	Water	>68
Not Available	Dissolved Minerals	<32
71-43-2	Benzene	<1
8002-05-9	Petroleum distillates (naphtha)	<1

Normal composition ranges are shown. Exceptions may occur depending on the source of the produced water.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes
Flush eyes with clean, low-pressure water for at least 15 minutes, occasionally lifting the eyelids. If pain or redness persists after flushing, obtain medical attention. If eye is exposed to hot liquid, cover eyes with cloth and seek medical attention immediately.
First Aid: Skin
In case of hot liquid exposure, do not remove clothing or treat-wash only unburned area and seek medical attention immediately.
First Aid: Ingestion
Do not induce vomiting. Seek medical attention.
First Aid: Inhalation
Immediately remove person to area of fresh air. For respiratory distress, give oxygen, rescue breathing, or administer CPR if necessary. Obtain prompt medical attention.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.
May react with strong oxidizing materials and a wide variety of chemicals. Forms explosive mixtures with air.

Hazardous Combustion Products

Not Determined.

Extinguishing Media

Dry chemical, foam, carbon dioxide, or water spray.

Fire Fighting Equipment/Instructions

Any fire would be associated with any natural gas condensate floating on the surface of the produced water. Water may be ineffective on flames but should be used to keep fire exposed containers cool. Keep the surrounding areas cool by using water mists. Firefighters should wear self-contained breathing apparatus and full protective clothing.

NFPA Ratings: Health: 1 **Fire:** 4 **Reactivity:** 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Personal Protection Equipment section. Contain liquid to prevent further contamination of soil and surface water.

Clean-Up Procedures

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment. Where feasible and appropriate, remove contaminated soil or flush with fresh water. Follow prescribed procedures for reporting and responding to larger releases. Advise authorities and the National Response Center (800-424-8802) if the release is to a watercourse.

Evacuation Procedures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible.

Special Procedures

Avoid excessive skin contact with the spilled material.

*** Section 7 - Handling and Storage ***

Handling Procedures

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Do not enter storage areas and confined spaces without adequate ventilation. Use appropriate respiratory protection if there is a potential to exceed component exposure limit(s).

*** Section 8 - Exposure Controls / Personal Protection ***

A: Component Exposure Limits

Petroleum distillates (naphtha) (8002-05-9)

OSHA: 500 ppm TWA; 2000 mg/m^3 TWA
NIOSH: 350 mg/m^3 TWA
1800 mg/m^3 Ceiling (15 min)

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH: 0.1 ppm TWA
1 ppm STEL

Engineering Controls

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Chemical goggles or face shield should be worn when handling product if the possibility of spray exists.

Personal Protective Equipment: Skin

Normal working clothes should be worn. Wash contaminated clothing prior to reuse.

Personal Protective Equipment: Respiratory

Respiratory protection is not required for normal use. At excessive concentrations, wear a NIOSH approved air purifying respirator with organic vapor cartridges.

Personal Protective Equipment: General

A source of clean water should be in the work area for flushing eyes and skin.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear or opaque	**Odor:**	Salty with a slight hydrocarbon odor.
Physical State:	Liquid	**pH:**	4.9-8.5
Vapor Pressure:	NA	**Vapor Density:**	1.2
Boiling Point:	212°F	**Melting Point:**	ND
Solubility (H2O):	Soluble	**Specific Gravity:**	>1 @ 0°C
Freezing Point:	<32°F	**Evaporation Rate:**	ND
VOC:	ND	**Octanol/H2O Coeff.:**	ND
Flash Point:	ND	**Flash Point Method:**	ND
		Lower Flammability Limit (LFL):	4.0
		Upper Flammability Limit (UFL):	46.0
		Burning Rate:	ND
		Auto Ignition:	NA

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Stable under normal ambient and anticipated conditions of storage and handling.

Chemical Stability: Conditions to Avoid

Keep material away from heat, sparks, and open flames.

Incompatibility

Keep away from strong oxidizers.

Hazardous Decomposition

Not Determined.

Possibility of Hazardous Reactions

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute Dose Effects

Component Analysis - LD50/LC50

Water (7732-18-5)
Oral LD50 Rat: >90 mL/kg

Petroleum distillates (naphtha) (8002-05-9)
Oral LD50 Rat: >4300 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

Benzene (71-43-2)
Inhalation LC50 Rat: 13050-14380 ppm/4H; Oral LD50 Rat:1800 mg/kg

Carcinogenicity

Component Carcinogenicity

Petroleum distillates (naphtha) (8002-05-9)
IARC: Monograph 45 [1989] (Group 3 (not classifiable))

Benzene (71-43-2)
ACGIH: A1 - Confirmed Human Carcinogen
OSHA: 10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH: potential occupational carcinogen
NTP: Known Human Carcinogen (Select Carcinogen)
IARC: Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

* * * Section 12 - Ecological Information * * *

Ecotoxicity

Component Analysis - Ecotoxicity - Aquatic Toxicity

Petroleum distillates (naphtha) (8002-05-9)

Test & Species		Conditions
96 Hr LC50 Salmo gairdneri	258 mg/L [static]	
24 Hr EC50 Daphnia magna	36 mg/L	

Benzene (71-43-2)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	12.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	22 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]	
72 Hr EC50 Selenastrum capricornutum	29 mg/L	
48 Hr EC50 water flea	356 mg/L [Static]	
48 Hr EC50 Daphnia magna	10 mg/L	

* * * Section 13 - Disposal Considerations * * *

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a "characteristic" hazardous waste. This product could also contain benzene at low concentrations and may exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed with or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

* * * Section 14 - Transportation Information * * *

US DOT Information

Shipping Name: Not Regulated

Additional Info.: This may not apply to all shipping situations. Consult 49CFR 172 for additional information.

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

Component Analysis

This material may contain one or more of the following chemicals identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration

CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Petroleum distillates (naphtha)	8002-05-9	No	Yes	Yes	Yes	Yes	Yes
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Benzene	71-43-2	0.1 %

Additional Regulatory Information

Material Safety Data Sheet

Material Name: Produced Water

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Water	7732-18-5	Yes	DSL	EINECS
Petroleum distillates (naphtha)	8002-05-9	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Other Information

The information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Key/Legend

NA - Not Applicable
ND - Not Determined
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
RQ - Reportable Quantity
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer

Health	1
Flammability	4
Reactivity	0
PPE	

Material Safety Data Sheet

Material Name: Petroleum Crude Oil

* * * Section 1 - Chemical Product and Company Identification * * *

Product name: Petroleum Crude Oil
Synonyms: Crude Oil, Non-hydrogen sulfide crude oil, sweet crude oil, petroleum distillates (naphtha)
Chemical Family: Petroleum Hydrocarbon
Formula: Complex mixture

Supplier: Chesapeake Energy Corporation and its subsidiaries
6100 N. Western Avenue
Oklahoma City, OK 73118

Other Information: Phone: 405-848-8000 Fax: 405-753-5468
Emergency Phone Number: Chemtrec – 800-424-9300

* * * Section 2 - Hazards Identification * * *

Emergency Overview

FLAMMABLE LIQUID - HIGH FIRE HAZARD - Keep away from heat and ignition sources. High concentrations may cause immediate unconsciousness - death may result unless promptly and successfully resuscitated. Petroleum Crude Oil is a liquid that ranges in color from amber to black depending on the source.

Potential Health Effects: Eyes

Contact with eyes may cause moderate to severe irritation.

Potential Health Effects: Skin

Practically non-toxic if absorbed following a single exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly. Rare, pre-cancerous warts on the forearms, hands and scrotum have been reported from prolonged or repeated skin contact.

Potential Health Effects: Ingestion

The health threat of ingestion occurs from the danger of aspiration of the liquids into the lungs. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure or even death. Ingestion may cause gastrointestinal problems, or central nervous system effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs, and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma respiratory failure, and death may occur.

HMIS Ratings: Health: 1 **Fire:** 4 **HMIS Reactivity** 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 3 - Composition / Information on Ingredients * * *

Petroleum Crude Oil is a complex mixture of paraffinic, cycloparaffinic and aromatic hydrocarbons with a range of carbon numbers between C1 to C60+. Petroleum Crude Oil can contain minor amounts of sulfur, nitrogen and oxygen compounds as well as trace amounts of heavy metals such as nickel, vanadium and lead. Composition varies depending on source of crude.

CAS #	Component	Percent Ranges
8002-05-9	Petroleum distillates (naphtha)	98-100
1330-20-7	Xylenes (o-, m-, p- isomers)	0-5
108-88-3	Toluene	0-5
100-41-4	Ethyl benzene	0-5
71-43-2	Benzene	0-5

*** Section 4 - First Aid Measures ***

First Aid: Eyes

Flush immediately with fresh water for at least 15 minutes while holding eyelids open. Remove contact lenses if worn. Seek medical attention if irritation persists.

First Aid: Skin

Remove contaminated clothing. Wash skin thoroughly with soap and water. Wash contaminated clothing. Discard contaminated non-waterproof shoes or boots. See a doctor if any signs or symptoms described in this document occur. DO NOT use solvents for washing.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical treatment. If spontaneous vomiting occurs, lean the victim forward to reduce the risk of aspiration and monitor for breathing difficulties.

First Aid: Inhalation

If signs and symptoms described in this document occur, move person to fresh air. If these effects continue, seek medical attention. If breathing is difficult, give oxygen. If breathing has stopped, begin artificial respiration (CPR) and activate 911.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Flash point and explosive limits are highly dependent on the crude oil source. Treat as an OSHA/NFPA flammable liquid unless otherwise indicated. Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon Monoxide, Carbon Dioxide and Reactive Hydrocarbon Compounds.

Extinguishing Media

Dry Chemical, Carbon Dioxide (CO2), Foam (Foam and water fog can cause frothing.)

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

NFPA Ratings: Health: 1 **Fire:** 4 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection - do not discharge solid water stream patterns into the liquid resulting in splashing.

Clean-Up Procedures

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Evacuation Procedures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Product may release substantial amounts of flammable vapors and gases (e.g., methane, ethane, and propane), at or below ambient temperature depending on source and process conditions and pressure.

Special Procedures

Avoid excessive skin contact with the spilled material.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquids Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API STD 2015 "Safe Entry and Cleaning of Petroleum Storage Tanks". Avoid vapors when opening hatches and dome covers. Confined spaces should be ventilated prior to entry.

* * * Section 8 - Exposure Controls / Personal Protection * * *

A: Component Exposure Limits

Petroleum distillates (naphtha) (8002-05-9)

OSHA: 500 ppm TWA; 2000 mg/m^3 TWA
NIOSH: 350 mg/m^3 TWA
1800 mg/m^3 Ceiling (15 min)

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 300 ppm Ceiling; 500 ppm (10 min.)
NIOSH: 100 ppm TWA; 375 mg/m^3 TWA
150 ppm STEL; 560 mg/m^3 STEL

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m^3 TWA
150 ppm STEL; 655 mg/m^3 STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH: 0.1 ppm TWA
1 ppm STEL

Ethyl benzene (100-41-4)

ACGIH:	100 ppm TWA 125 ppm STEL
OSHA:	100 ppm TWA; 435 mg/m^3 TWA 125 ppm STEL; 545 mg/m^3 STEL
NIOSH:	100 ppm TWA; 435 mg/m^3 TWA 125 ppm STEL; 545 mg/m^3 STEL

Engineering Controls

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Chemical splash goggles or safety glasses are recommended.

Personal Protective Equipment: Skin

Neoprene, impervious gloves should be worn to avoid prolonged or frequently repeated skin contact with this material. Normal work clothes should be laundered to decontaminate before reuse. Leather goods contaminated with this product should be discarded. Impervious clothing and boots may be required for prolonged contact.

Personal Protective Equipment: Respiratory

Respiratory protection is not required during normal use in well-ventilated areas. Use a positive-pressure air supplied respirator if there is a (1) potential for uncontrolled release, (2) where exposure levels are not known, (3) oxygen deficient atmospheres, or (4) any condition where ventilation or an air-purifying type of respirator may not be adequate.

Personal Protective Equipment: General

Avoid repeated and prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not gasoline or solvents for washing. Discard leather shoes and gloves contaminated with this product. Launder contaminated clothing before reuse.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Depending on its source, the typical color ranges from amber to brown to greenish black.	**Odor:**	Petroleum/asphalt type
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	Variable	**Vapor Density:**	3 - 5 typical
Boiling Point:	AP 100° - 1000+°F	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	AP 0.7 - 1.04 - (Varies)
Evaporation Rate:	ND	**VOC:**	ND
Octanol/H2O Coeff.:			
Flash Point:	< 40 to 200°F	**Upper Flammability Limit (UFL):**	15
Flash Point Method:	ND	**Lower Flammability Limit (LFL):**	0.4
		Burning Rate:	ND
		Auto Ignition:	500°F

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Chemical Stability: Conditions to Avoid

Heat, sparks, open flame, static electricity or ignition sources should be avoided.

Incompatibility

Keep away from strong oxidizing agents (such as Peroxide, Dichromate, Permanganate, Chlorine), strong acids, caustics and halogens.

Hazardous Decomposition

Carbon Monoxide, Carbon Dioxide and Reactive Hydrocarbon Compounds.

Possibility of Hazardous Reactions

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute Dose Effects

Component Analysis - LD50/LC50

Petroleum distillates (naphtha) (8002-05-9)

Oral LD50 Rat: >4300 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat: 12.5 mg/L/4H; Inhalation LC50 Rat:>26700 ppm/1H; Oral LD50 Rat:636 mg/kg; Dermal LD50 Rabbit:8390 mg/kg; Dermal LD50 Rat:12124 mg/kg

Xylenes (o-, m-, p- isomers) (1330-20-7)

Inhalation LC50 Rat: 5000 ppm/4H; Oral LD50 Rat: 4300 mg/kg; Dermal LD50 Rabbit: >1700 mg/kg

Benzene (71-43-2)

Inhalation LC50 Rat: 13050-14380 ppm/4H; Oral LD50 Rat:1800 mg/kg

Ethyl benzene (100-41-4)

Inhalation LC50 Rat: 17.2 mg/L/4H; Oral LD50 Rat:3500 mg/kg; Dermal LD50 Rabbit:15354 mg/kg

Carcinogenicity

Component Carcinogenicity

Petroleum distillates (naphtha) (8002-05-9)

IARC: Monograph 45 [1989] (Group 3 (not classifiable))

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999], Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999], Monograph 47 [1989] (Group 3 (not classifiable))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen
OSHA: 10 ppm TWA; 25 ppm ceiling; 50 ppm (10 min.)
NIOSH: potential occupational carcinogen
NTP: Known Carcinogen (Select Carcinogen)
IARC: Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Ethyl benzene (100-41-4)

ACGIH: A3 - Confirmed animal carcinogen with unknown relevance to humans
IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

* * * Section 12 - Ecological Information * * *

Ecotoxicity

Component Analysis - Ecotoxicity - Aquatic Toxicity

Petroleum distillates (naphtha) (8002-05-9)

Test & Species		Conditions
96 Hr LC50 Salmo gairdneri	258 mg/L [static]	
24 Hr EC50 Daphnia magna	36 mg/L	

Toluene (108-88-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	25 mg/L [flow-through]	1 day old
96 Hr LC50 Oncorhynchus mykiss	24.0 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	24.0 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	13 mg/L [static]	
96 Hr EC50 Selenastrum capricornutum	>433 mg/L	
30 min EC50 Photobacterium phosphoreum	19.7 mg/L	
48 Hr EC50 water flea	11.3 mg/L	
48 Hr EC50 water flea	310 mg/L	
48 Hr EC50 Daphnia magna	11.3 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	8.05 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	16.1 mg/L [flow-through]	
96 Hr LC50 Pimephales promelas	26.7 mg/L [static	
24 hr EC50 Photobacterium phosphoreum	0.0084 mg/L	
48 Hr EC50 water flea	3.82 mg/L	
48 Hr LC50 Gammarus lacustris	0.6 mg/L	

Benzene (71-43-2)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	12.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	22 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]	
72 Hr EC50 Selenastrum capricornutum	29 mg/L	
48 Hr EC50 water flea	356 mg/L [Static]	
48 Hr EC50 Daphnia magna	10 mg/L	

Ethyl benzene (100-41-4)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	14.0 mg/L [static]	
96 Hr LC50 Pimephales promelas	9.09 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	150.0 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]	
96 Hr LC50 Pimephales promelas	48.5 mg/L [static]	
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]	
72 Hr EC50 Selenastrum capricornutum	4.6 mg/L	
96 Hr EC50 Selenastrum capricornutum	>438 mg/L	
30 min EC50 Photobacterium phosphoreum	9.68 mg/L	
24 Hr EC50 Nitrosomonas	96 mg/L	
48 Hr EC50 Daphnia magna	1.8-2.4 mg/L	

* * * Section 13 - Disposal Considerations * * *

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a "characteristic" hazardous waste. This product could also contain benzene at low concentrations and may exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed with or contaminated with a hazardous waste or other substance(s).

It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

* * * Section 14 - Transportation Information * * *

This material when transported via U.S. commerce would be regulated by DOT Regulations.

US DOT Information

Shipping Name: Petroleum Crude Oil
UN/NA #: 1267 **Hazard Class:** 3 **Packing Group:** II
DOT reportable quantity (lbs): Not Applicable
Additional Info.: This description shown may not apply to all shipping situations. Consult 49CFR 172.101 for mode or quantity-specific requirements.

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

Component Analysis

This material contains one or more of the following chemicals identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)

SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene (71-43-2)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Ethyl benzene (100-41-4)
SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Petroleum distillates (naphtha)	8002-05-9	No	Yes	Yes	Yes	Yes	Yes
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	Yes
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	Yes
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	Yes
Ethyl benzene	100-41-4	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Benzene	71-43-2	0.1 %
Ethyl benzene	100-41-4	0.1 %

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Petroleum distillates (naphtha)	8002-05-9	Yes	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Ethyl benzene	100-41-4	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Other Information

The information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

Material Safety Data Sheet

Material Name: Petroleum Crude Oil

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Key/Legend

NA - Not Applicable
ND - Not Determined
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
RQ – Reportable Quantity
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer

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	Waukesha L5794 GSI Engine	2010	1,380-hp	Removal; 6/19/14	NSCR
EUCE-2	EPCE-2	Waukesha L5794 GSI Engine	2010	1,380-hp	Existing	NSCR
EUCE-3	EPCE-3	Waukesha L5794 GSI Engine	2010	1,380-hp	Existing	NSCR
EUCE-4	EPCE-4	Waukesha L5794 GSI Engine	2010	1,380-hp	Existing	NSCR
EUCE-5	EPCE-5	Waukesha L5794 GSI Engine	2010	1,380-hp	Existing	NSCR
EUCE-6	EPCE-6	Waukesha L5794 GSI Engine	2010	1,380-hp	Existing	NSCR
EUCE-7	EPCE-7	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-8	EPCE-8	Caterpillar G3516B Engine	2012	1,380-hp	Modification	Oxid. Cat.
EUCE-9	EPCE-9	Caterpillar G3516B Engine	2012	1,380-hp	Removal; 6/19/14	Oxid. Cat.
EUCE-9	EPCE-9	Caterpillar G3516B Engine	TBD	1,380-hp	New	Oxid. Cat.
EUCE-10	EPCE-10	Caterpillar G3516B Engine	2012	1,380-hp	Removal; 6/19/14	Oxid. Cat.
EUCE-10	EPCE-10	Caterpillar G3516B Engine	TBD	1,380-hp	New	Oxid. Cat.
EUCE-11	EPCE-11	Caterpillar G3516B Engine	2012	1,380-hp	Removal; 6/19/14	Oxid. Cat.
EUCE-11	EPCE-11	Caterpillar G3516B Engine	TBD	1,380-hp	New	Oxid. Cat.
EUCE-12	EPCE-12	Caterpillar G3516B Engine	TBD	1,380-hp	New	Oxid. Cat.
EUGEN-1	EPGEN-1	Capstone C600 Microturbine Generator	2010	805-hp	Existing	N/A
EUGEN-2	EPGEN-2	Capstone C600 Microturbine Generator	2010	805-hp	Existing	N/A
EUDHY-1	EPSTL-1	Glycol Dehydration Unit Still Vent	2010	53.8 MMSCFD	Modification	APCCOND-1
EUDHY-1	EPRBL-1	Glycol Reboiler	2010	1.0-mmBtu/hr	Existing	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]
EUDHY-2	EPSTL-2	Glycol Dehydration Unit Still Vent	2010	53.8 MMSCFD	Modification	APCCOND-2
EUDHY-2	EPRBL-2	Glycol Reboiler	2010	1.0-mmBtu/hr	Existing	N/A
EUDHY-3	EPSTL-3	Glycol Dehydration Unit Still Vent	TBD	53.8 MMSCFD	Modification	APCCOND-3
EUDHY-3	EPRBL-3	Glycol Reboiler	TBD	1.0-mmBtu/hr	Existing	N/A
EUOH-1	EPOH-1	Hot Oil Heater	2010	3.35-mmBtu/hr	Existing	N/A
APCFLARE	APCFLARE	Flare	2010	15 scfh (Pilot)	Existing	N/A
EUTK-1	EPTK-1	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-2	EPTK-2	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-3	EPTK-3	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-4	EPTK-4	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-5	EPTK-5	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-6	EPTK-6	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-7	EPTK-7	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-8	EPTK-8	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-9	EPTK-9	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-10	EPTK-10	Stabilized Condensate Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-11	EPTK-11	Pipeline Fluids/Water Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EUTK-12	EPTK-12	Pipeline Fluids/Water Storage Tank	2010	400-bbl	Existing	Vapor Recovery Unit
EU-LOAD	EP-LOAD	Liquids Truck Loading	2010	13,797,000 gal	Existing	APC-CARBON
EU-FUG	EP-FUG	Fugitive Emissions	2010	N/A	Modification	N/A
EP-BD	EP-BD	Compressor Blowdowns	2010	4,290,000 scf/yr	New	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-2	Upward vertical stack piped directly to control device	EUCE-2	Waukesha L5794 GSI Compressor Engine	-	NSCR	-	-	NOx	42.29	185.22	1.48	6.48	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	26.77	117.26	1.81	7.92			
								VOC	0.91	4.00	0.14	0.62			
								PM_{10}	0.11	0.48	0.11	0.48			
								PM Total	0.22	0.98	0.22	0.98			
								SO_2	0.03	0.13	0.03	0.13			
								Acetaldehyde	0.03	0.13	0.01	0.06			
								Acrolein	0.03	0.12	0.01	0.06			
								Benzene	0.02	0.07	0.01	0.04			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	0.15	0.67	0.08	0.33			
								n-Hexane	-	-	-	-			
								Methanol	0.03	0.14	0.02	0.07			
								Toluene	0.01	0.03	<0.01	0.01			
								Xylenes	<0.01	0.01	<0.01	<0.01			
								CO_2	1,212.33	5,309.99	1,212.33	5,309.99			
								CH_4	0.02	0.10	0.02	0.10			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-3	Upward vertical stack piped directly to control device	EUCE-3	Waukesha L5794 GSI Compressor Engine	-	NSCR	-	-	NOx	42.29	185.22	1.48	6.48	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	26.77	117.26	1.81	7.92			
								VOC	0.91	4.00	0.14	0.62			
								PM_{10}	0.11	0.48	0.11	0.48			
								PM Total	0.22	0.98	0.22	0.98			
								SO_2	0.03	0.13	0.03	0.13			
								Acetaldehyde	0.03	0.13	0.01	0.06			
								Acrolein	0.03	0.12	0.01	0.06			
								Benzene	0.02	0.07	0.01	0.04			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	0.15	0.67	0.08	0.33			
								n-Hexane	-	-	-	-			
								Methanol	0.03	0.14	0.02	0.07			
								Toluene	0.01	0.03	<0.01	0.01			
								Xylenes	<0.01	0.01	<0.01	<0.01			
								CO_2	1,212.33	5,309.99	1,212.33	5,309.99			
								CH_4	0.02	0.10	0.02	0.10			
								N_2O	<0.01	0.01	<0.01	0.01			

EPCE-4	Upward vertical stack piped directly to control device	EUCE-4	Waukesha L5794 GSI Compressor Engine	-	NSCR	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	42.29 26.77 0.91 0.11 0.22 0.03 0.03 0.03 0.02 <0.01 0.15 - 0.03 0.01 <0.01 1,212.33 0.02 <0.01	185.22 117.26 4.00 0.48 0.98 0.13 0.13 0.12 0.07 <0.01 0.67 - 0.14 0.03 0.01 5,309.99 0.10 0.01	1.48 1.81 0.14 0.11 0.22 0.03 0.01 0.01 0.01 <0.01 0.08 - 0.02 <0.01 <0.01 1,212.33 0.02 <0.01	6.48 7.92 0.62 0.48 0.98 0.13 0.06 0.06 0.04 <0.01 0.33 - 0.07 0.01 <0.01 5,309.99 0.10 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPCE-5	Upward vertical stack piped directly to control device	EUCE-5	Waukesha L5794 GSI Compressor Engine	-	NSCR	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	42.29 26.77 0.91 0.11 0.22 0.03 0.03 0.03 0.02 <0.01 0.15 - 0.03 0.01 <0.01 1,212.33 0.02 <0.01	185.22 117.26 4.00 0.48 0.98 0.13 0.13 0.12 0.07 <0.01 0.67 - 0.14 0.03 0.01 5,309.99 0.10 0.01	1.48 1.81 0.14 0.11 0.22 0.03 0.01 0.01 0.01 <0.01 0.08 - 0.02 <0.01 <0.01 1,212.33 0.02 <0.01	6.48 7.92 0.62 0.48 0.98 0.13 0.06 0.06 0.04 <0.01 0.33 - 0.07 0.01 <0.01 5,309.99 0.10 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPCE-6	Upward vertical stack piped directly to control device	EUCE-6	Waukesha L5794 GSI Compressor Engine	-	NSCR	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	42.29 26.77 0.91 0.11 0.22 0.03 0.03 0.03 0.02 <0.01 0.15 - 0.03 0.01 <0.01 1,212.33 0.02 <0.01	185.22 117.26 4.00 0.48 0.98 0.13 0.13 0.12 0.07 <0.01 0.67 - 0.14 0.03 0.01 5,309.99 0.10 0.01	1.48 1.81 0.14 0.11 0.22 0.03 0.01 0.01 0.01 <0.01 0.08 - 0.02 <0.01 <0.01 1,212.33 0.02 <0.01	6.48 7.92 0.62 0.48 0.98 0.13 0.06 0.06 0.04 <0.01 0.33 - 0.07 0.01 <0.01 5,309.99 0.10 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-

EPCE-7	Upward vertical stack piped directly to control device	EUCE-7	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	1.52 8.24 1.46 <0.01 0.13 0.03 0.09 0.06 <0.01 <0.01 1.31 0.01 0.03 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 36.11 6.40 <0.01 0.55 0.14 0.42 0.26 0.02 <0.01 5.73 0.06 0.12 0.02 0.01 6,729.32 0.11 0.01	1.52 1.52 0.79 <0.01 0.13 0.03 0.02 0.01 <0.01 <0.01 0.31 <0.01 0.01 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 6.66 3.46 <0.01 0.55 0.14 0.10 0.06 0.01 <0.01 1.38 0.01 0.03 <0.01 <0.01 6,729.32 0.11 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPCE-8	Upward vertical stack piped directly to control device	EUCE-8	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	1.52 8.24 1.46 <0.01 0.13 0.03 0.09 0.06 <0.01 <0.01 1.31 0.01 0.03 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 36.11 6.40 <0.01 0.55 0.14 0.42 0.26 0.02 <0.01 5.73 0.06 0.12 0.02 0.01 6,729.32 0.11 0.01	1.52 1.52 0.79 <0.01 0.13 0.03 0.02 0.01 <0.01 <0.01 0.31 <0.01 0.01 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 6.66 3.46 <0.01 0.55 0.14 0.10 0.06 0.01 <0.01 1.38 0.01 0.03 <0.01 <0.01 6,729.32 0.11 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-

EPCE-9	Upward vertical stack piped directly to control device	EUCE-9	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	1.52 8.24 1.46 <0.01 0.13 0.03 0.09 0.06 <0.01 <0.01 1.31 0.01 0.03 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 36.11 6.40 <0.01 0.55 0.14 0.42 0.26 0.02 <0.01 5.73 0.06 0.12 0.02 0.01 6,729.32 0.11 0.01	1.52 1.52 0.79 <0.01 0.13 0.03 0.02 0.01 <0.01 <0.01 0.31 <0.01 0.01 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 6.66 3.46 <0.01 0.55 0.14 0.10 0.06 0.01 <0.01 1.38 0.01 0.03 <0.01 <0.01 6,729.32 0.11 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPCE-10	Upward vertical stack piped directly to control device	EUCE-10	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	1.52 8.24 1.46 <0.01 0.13 0.03 0.09 0.06 <0.01 <0.01 1.31 0.01 0.03 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 36.11 6.40 <0.01 0.55 0.14 0.42 0.26 0.02 <0.01 5.73 0.06 0.12 0.02 0.01 6,729.32 0.11 0.01	1.52 1.52 0.79 <0.01 0.13 0.03 0.02 0.01 <0.01 <0.01 0.31 <0.01 0.01 <0.01 <0.01 1,536.38 0.03 <0.01	6.66 6.66 3.46 <0.01 0.55 0.14 0.10 0.06 0.01 <0.01 1.38 0.01 0.03 <0.01 <0.01 6,729.32 0.11 0.01	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-

EPCE-11	Upward vertical stack piped directly to control device	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	8.24	36.11	1.52	6.66			
								VOC	1.46	6.40	0.79	3.46			
								PM_{10}	<0.01	<0.01	<0.01	<0.01			
								PM Total	0.13	0.55	0.13	0.55			
								SO_2	0.03	0.14	0.03	0.14			
								Acetaldehyde	0.09	0.42	0.02	0.10			
								Acrolein	0.06	0.26	0.01	0.06			
								Benzene	<0.01	0.02	<0.01	0.01			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.31	5.73	0.31	1.38			
								n-Hexane	0.01	0.06	<0.01	0.01			
								Methanol	0.03	0.12	0.01	0.03			
								Toluene	<0.01	0.02	<0.01	<0.01			
								Xylenes	<0.01	0.01	<0.01	<0.01			
								CO_2	1,536.38	6,729.32	1,536.38	6,729.32			
								CH_4	0.03	0.11	0.03	0.11			
								N_2O	<0.01	0.01	<0.01	0.01			
EPCE-12	Upward vertical stack piped directly to control device	EUCE-12	Caterpillar G3516B Compressor Engine	-	Oxidation Catalyst	-	-	NOx	1.52	6.66	1.52	6.66	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
								CO	8.24	36.11	1.52	6.66			
								VOC	1.46	6.40	0.79	3.46			
								PM_{10}	<0.01	<0.01	<0.01	<0.01			
								PM Total	0.13	0.55	0.13	0.55			
								SO_2	0.03	0.14	0.03	0.14			
								Acetaldehyde	0.09	0.42	0.02	0.10			
								Acrolein	0.06	0.26	0.01	0.06			
								Benzene	<0.01	0.02	<0.01	0.01			
								Ethylbenzene	<0.01	<0.01	<0.01	<0.01			
								Formaldehyde	1.31	5.73	0.31	1.38			
								n-Hexane	0.01	0.06	<0.01	0.01			
								Methanol	0.03	0.12	0.01	0.03			
								Toluene	<0.01	0.02	<0.01	<0.01			
								Xylenes	<0.01	0.01	<0.01	<0.01			
								CO_2	1,536.38	6,729.32	1,536.38	6,729.32			
								CH_4	0.03	0.11	0.03	0.11			
								N_2O	<0.01	0.01	<0.01	0.01			

EPGEN-1	Upward vertical stack piped directly to control device	EPGEN-1	Microturbine Generator	-	None	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	0.25 0.56 0.01 0.01 0.05 0.02 <0.01 <0.01 <0.01 <0.01 <0.01 - - <0.01 <0.01 800.13 0.02 <0.01	1.09 2.46 0.06 0.06 0.20 0.09 <0.01 <0.01 <0.01 <0.01 0.02 - - <0.01 <0.01 3,504.58 0.07 0.01	-	-	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPGEN-2	Upward vertical stack piped directly to control device	EPGEN-2	Microturbine Generator	-	None	-	-	NOx CO VOC PM_{10} PM Total SO_2 Acetaldehyde Acrolein Benzene Ethylbenzene Formaldehyde n-Hexane Methanol Toluene Xylenes CO_2 CH_4 N_2O	0.25 0.56 0.01 0.01 0.05 0.02 <0.01 <0.01 <0.01 <0.01 <0.01 - - <0.01 <0.01 800.13 0.02 <0.01	1.09 2.46 0.06 0.06 0.20 0.09 <0.01 <0.01 <0.01 <0.01 0.02 - - <0.01 <0.01 3,504.58 0.07 0.01	-	-	Gas/Vapor	O (Manufacturer Data/AP-42\EPA)	-
EPSTL-1	Upward vertical stack piped directly to control device	EUDHY-1	Glycol Dehydrator Still Vent	APCCOND-1	Condenser	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	11.00 0.48 1.48 0.16 1.74 0.23 0.01 2.28	48.17 2.11 6.49 0.72 7.61 1.03 0.06 9.98	0.49 0.02 0.06 0.00 0.04 0.01 <0.01 0.11	2.13 0.10 0.25 0.02 0.18 0.05 <0.01 0.50	Gas/Vapor	O (GRI GLYCalc)	-

EPRBL-1	Upward vertical stack	EUDHY-1	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{10} PM Total SO_2 n-Hexane CO_2 CH_4 N_2O	0.09 0.07 <0.01 0.01 0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.38 0.32 0.02 0.02 0.03 <0.01 0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPSTL-2	Upward vertical stack piped directly to control device	EUDHY-2	Glycol Dehydrator Still Vent	APCCOND-2	Condenser	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	11.00 0.48 1.48 0.16 1.74 0.23 0.01 2.28	48.17 2.11 6.49 0.72 7.61 1.03 0.06 9.98	0.49 0.02 0.06 0.00 0.04 0.01 <0.01 0.11	2.13 0.10 0.25 0.02 0.18 0.05 <0.01 0.50	Gas/Vapor	O (GRI GLYCalc)	-
EPRBL-2	Upward vertical stack	EUDHY-2	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{10} PM Total SO_2 n-Hexane CO_2 CH_4 N_2O	0.09 0.07 <0.01 0.01 0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.38 0.32 0.02 0.02 0.03 <0.01 0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-
EPSTL-3	Upward vertical stack piped directly to control device	EUDHY-3	Glycol Dehydrator Still Vent	APCCOND-3	Condenser	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	11.00 0.48 1.48 0.16 1.74 0.23 0.01 2.28	48.17 2.11 6.49 0.72 7.61 1.03 0.06 9.98	0.49 0.02 0.06 0.00 0.04 0.01 <0.01 0.11	2.13 0.10 0.25 0.02 0.18 0.05 <0.01 0.50	Gas/Vapor	O (GRI GLYCalc)	-
EPRBL-3	Upward vertical stack	EUDHY-3	Glycol Dehydrator Reboiler	-	-	-	-	NOx CO VOC PM_{10} PM Total SO_2 n-Hexane CO_2 CH_4 N_2O	0.09 0.07 <0.01 0.01 0.01 <0.01 <0.01 116.98 <0.01 <0.01	0.38 0.32 0.02 0.02 0.03 <0.01 0.01 512.36 0.01 <0.01	-	-	Gas/Vapor	O (AP-42)	-

EPOH-1	Upward vertical stack	EUOH-1	Hot Oil Heater	-	-	-	-	NOx CO VOC PM_{10} PM Total SO_2 n-Hexane CO_2 CH_4 N_2O	0.29 0.25 0.02 0.02 0.02 <0.01 0.01 391.87 0.01 <0.01	1.29 1.08 0.07 0.07 0.10 <0.01 0.02 1,716.40 0.03 <0.01	-	-	Gas/Vapor	O (AP-42)	-
APC-FLARE	Upward vertical stack	APC-FLARE	Flare	-	-	-	-	NOx CO VOC PM_{10} SO_2 Benzene Toluene Xylenes Formaldehyde n-Hexane CO_2 CH_4 N_2O	2.89 15.62 924.12 <0.01 <0.01 0.01 0.01 <0.01 <0.01 13.18 29.72 558.81 <0.01	0.45 2.11 121.43 0.01 <0.01 <0.01 <0.01 <0.01 <0.01 1.73 88.83 73.43 <0.01	2.89 15.62 18.48 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 0.26 29.72 11.18 <0.01	0.45 2.11 2.43 0.01 <0.01 <0.01 <0.01 <0.01 <0.01 0.03 88.83 1.62 <0.01	Gas/Vapor	O (AP-42)	-
EPTK-1 – EPTK-12	Tank Vent	EUTK-1 – EUTK-12	Twelve (12) 400-bbl Tanks	Vapor Recovery Unit	-	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane	N/A N/A N/A N/A N/A N/A	362.25 0.20 0.12 <0.01 0.02 12.34	N/A N/A N/A N/A N/A N/A	7.24 <0.01 <0.01 <0.01 <0.01 0.25	Gas/Vapor	O (TANKS 4.0.9d)	
EP-LOAD	Fugitive	EU-LOAD	Truck Loading	APC-CARBON	-	-	-	VOC CO_2 CH_4 Benzene Toluene Ethylbenzene Xylenes n-Hexane	N/A N/A N/A N/A N/A N/A N/A N/A	22.73 0.04 1.71 0.20 0.30 0.02 0.11 0.36	N/A N/A N/A N/A N/A N/A N/A N/A	7.61 0.01 0.57 0.07 0.10 0.01 0.04 0.12	Gas/Vapor	O (AP-42)	-
EP-FUG	Fugitive	EU-FUG	Fugitive Emissions	-	-	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	N/A N/A N/A N/A N/A N/A N/A N/A	8.56 <0.01 0.01 <0.01 <0.01 0.09 0.46 108.71	-	-	Gas/Vapor	O (API)	-

EP-BD	Fugitive	EU-BD	Compressor Blowdowns	-	-	-	-	VOC Benzene Toluene Ethylbenzene Xylenes n-Hexane CO_2 CH_4	24.93 0.01 0.02 <0.01 <0.01 0.26 1.33 239.01	8.23 <0.01 0.01 <0.01 <0.01 0.09 0.44 78.87	-	-	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. (ºF)	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-2	1.0	1,149	6,525	138.5	~900	20 (est.)	4396.730	532.478
EPCE-3	1.0	1,149	6,525	138.5	~900	20 (est.)	4396.730	532.478
EPCE-4	1.0	1,149	6,525	138.5	~900	20 (est.)	4396.730	532.478
EPCE-5	1.0	1,149	6,525	138.5	~900	20 (est.)	4396.730	532.478
EPCE-6	1.0	1,149	6,525	138.5	~900	20 (est.)	4396.730	532.478
EPCE-7	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPCE-8	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPCE-9	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPCE-10	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPCE-11	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPCE-12	1.0	995	9,156	195.99	~900	20 (est.)	4396.730	532.478
EPSTL-1	N/A	212	N/A	N/A	~900	N/A	4396.730	532.478
EPRBL-1	1.3	N/A	N/A	N/A	~900	N/A	4396.730	532.478
EPSTL-2	N/A	212	N/A	N/A	~900	N/A	4396.730	532.478
EPRBL-2	1.3	N/A	N/A	N/A	~900	N/A	4396.730	532.478

Emission Point ID No. *(Must match Emission Units Table*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (ºF)	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
EPSTL-3	N/A	212	N/A	N/A	~900	N/A	4396.730	532.478
EPRBL-3	1.3	N/A	N/A	N/A	~900	N/A	4396.730	532.478
EPOH-1	N/A	N/A	N/A	N/A	~900	20	4396.730	532.478
APCFLARE	0.8	250	N/A	279.9	~900	75.4	4396.730	532.478
EPTK-1 – EPTK-12	N/A	Ambient	N/A	N/A	~900	20	4396.730	532.478
EP-LOAD	N/A	Ambient	N/A	N/A	~900	20	4396.730	532.478
EP-FUG	N/A	Ambient	N/A	N/A	~900	N/A	4396.730	532.478
EP-BD	N/A	Ambient	N/A	N/A	~900	20 (est.)	4396.730	532.478

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

Note: Greenhouse Gas (GHG) emissions were calculated using EPA Mandatory Reporting Rule and 2009 API Compendium guidance, as well as manufacturer data (if available). Emissions calculation methodologies that calculated emissions in metric tons (tonnes) were converted to short tons for consistency with other pollutants.

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	VOC n-Hexane Benzene Toluene Ethylbenzene Xylenes CO_2 CH_4	Does not apply	22.73 0.36 0.20 0.30 0.02 0.11 0.04 1.71	Does not apply	N/A	O (AP-42 5.2-4)
Wastewater Treatment Evaporation & Operations						
Equipment Leaks	VOC n-Hexane Benzene Toluene Ethylbenzene Xylenes CO_2 CH_4	Does not apply	8.56 0.09 <0.01 0.01 <0.01 <0.01 0.46 108.71	Does not apply	N/A	O (API)
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, as well as manufacturer data (if available). Emissions calculation methodologies that calculated emissions in metric tons (tonnes) were converted to short tons for consistency with other pollutants.

ATTACHMENT L: EMISSION UNIT DATA SHEETS

EUDS - General: Compressor Engines

EUDS – General: Dehydrators

EUDS - Chemical Process (Leak Sources)

EUDS – General: Compressor Blowdowns

Note: Only equipment affected by this project has been included in this application. All other equipment remains as permitted.

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 six (6) identical 1,380-hp Caterpillar G3516B Compressor Engine w/ Oxidation Catalysts (EUCE-7 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*.

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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 8,226 Btu per horsepower-hour for 8,760 hours per year at maximum horsepower rating, which equals 87.78 million cubic feet per year per unit at 1,138 Btu per standard cubic foot. However, AMS requests to retain current limitation for fuel use: 99.01 million cubic feet per year.

(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: 11.35 $\times 10^6$ 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:				
@	995	°F and	14.7	psia
a. NO_X	1.52	lb/hr		grains/ACF
b. SO_2	0.03	lb/hr		grains/ACF
c. CO	8.24	lb/hr		grains/ACF
d. PM_{10}	<0.01	lb/hr		grains/ACF
e. Hydrocarbons		lb/hr		grains/ACF
f. VOCs	1.46	lb/hr		grains/ACF
g. Pb		lb/hr		grains/ACF
h. Specify other(s)				
Total HAPs	1.51	lb/hr		grains/ACF
PM_{TOT}	0.13	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 None Proposed	RECORDKEEPING None Proposed
REPORTING None Proposed	TESTING 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 glycol dehydration units (EUDHY-1, EUDHY-2 and EUDHY3)
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 53.8 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*.

Revision 03/2007

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

@ 212 °F and 14.8 psia

a. NO_X	0.08 lb/hr	grains/ACF
b. SO_2	<0.01 lb/hr	grains/ACF
c. CO	0.07 lb/hr	grains/ACF
d. PM_{10}	<0.01 lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs	38.99* lb/hr	grains/ACF
g. Pb	N/A lb/hr	grains/ACF
h. Specify other(s)		
Total HAPs	4.23* lb/hr	grains/ACF
**Still vent, flash tank and reboiler emissions*	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 53.8 MMSCFD based on an annual average. b. The lean glycol flow rate of the glycol dehydration unit will not exceed 15 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 burned as fuel. 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 routed to the flash gas suction scrubber.	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
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)
1311

3. List raw materials and ☒ attach MSDSs
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.

This facility was subject to this subpart based on the Joule-Thomson (JT) system; however, the system has been removed and this subpart no longer applies.

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]				
	heavy liquid VOC[8]				
	Non-VOC[9]	As shown in the emissions calculations located in Attachment N, the fugitive emission factors are given on an equipment basis, rather than an individual component basis. The factors presented in the API Compendium are for methane emissions; therefore, the fugitive VOC and HAP emissions were calculated using a gas analysis.			
Valves[10]	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC				
	Non VOC				
Open-ended Lines[12]	VOC				
	Non-VOC				
Sampling Connections[13]	VOC				
	Non-VOC				
Compressors	VOC				
	Non-VOC				
Flanges	VOC				
	Non-VOC				
Other	VOC				
	Non-VOC				

1 - 13 See notes on the following page.

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 $\times 10^6$ 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*	24.93	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Total HAPs*	0.30	lb/hr	grains/ACF
		lb/hr	grains/ACF
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 M: AIR POLLUTION CONTROL DEVICE SHEET

APCDS – Condenser

GRI-GLYCalc ™ Condenser Control Efficiency Curves Report (Electric Pump)

GRI-GLYCalc ™ Condenser Vent Stream (Electric Pump)

GRI-GLYCalc ™ Flash Tank Off-Gas Stream (Electric Pump)

GRI-GLYCalc ™ Condenser Control Efficiency Curves Report (Gas Pumps)

GRI-GLYCalc ™ Condenser Vent Stream (Gas Pumps)

GRI-GLYCalc ™ Flash Tank Off-Gas Stream (Gas Pumps)

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: NATCO Model No. BTEX Buster	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 ft³	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: 10.25 ft³/min *Regenerator Overheads Stream	19. Gas flow rate: 10.25 ft³/min *Regenerator Overheads Stream
20. Coolant flow rate per condenser: Type: Water: - gal/min Air: N/A ft³/min Other: - lb/hour	21. Coolant flow rate per condenser: Type: Water: - gal/min Air: N/A ft³/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 ft²	25. Condenser surface area: N/A ft²

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				
Total Concentration in ppmv		-		

Emission Gas (Vapor) Stream

27. **Before Condenser (Regenerator Overheads)**

Inlet vapor flow rate: 10.25 ft³/min

Influent vapor temperature: 212 °F

Effluent vapor temperature: 120 °F

28. **After Condenser (Condenser Vent Stream)**

Inlet vapor flow rate: 2.88 ft³/min

Influent vapor temperature: 212 °F

Effluent vapor temperature: 120 °F

29. Pollutant	INLET*			OUTLET*		
	Vapor Pressure	Condensation Temperature	Rate lb/hr	Rate lb/hr	Vapor Pressure	Condensation Temperature
A VOC	N/A	N/A	11.01	8.87	N/A	N/A
B Benzene	N/A	N/A	0.48	0.42	N/A	N/A
C Toluene	N/A	N/A	1.48	1.05	N/A	N/A
D Ethylbenzene	N/A	N/A	0.17	0.77	N/A	N/A
E Xylenes	N/A	N/A	1.74	0.74	N/A	N/A
F n-Hexane	N/A	N/A	0.24	0.22	N/A	N/A
G						
Total of the POLLUTANT lb/hr			11.01	8.87		

Inlet = Regenerator Overheads Stream.
Outlet = Condenser Vent Stream. Pollutants 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:

Each of the glycol dehydration units will not exceed the following limits:

a. The natural gas throughput will not exceed 53.8 MMSCFD based on an annual average.
b. The lean glycol flow rate of the glycol dehydration unit will not exceed 15 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 burned as fuel.
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 routed to the stabilizer feed drum.

RECORDKEEPING:

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:

None Proposed

TESTING:

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

GRI-GLYCalc VERSION 4.0 - CONDENSER CONTROL CURVE EFFICIENCY REPORT

Case Name: Miller Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Electric.ddf
Date: December 29, 2014

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	94.47	93.07	55.65
45.0	93.38	91.80	54.09
50.0	92.03	90.25	52.36
55.0	90.55	88.60	50.68
60.0	88.86	86.73	48.93
65.0	86.93	84.63	47.10
70.0	84.74	82.29	45.18
75.0	82.24	79.66	43.16
80.0	79.42	76.74	41.04
85.0	76.23	73.49	38.81
90.0	72.65	69.87	36.45
95.0	68.62	65.86	33.98
100.0	64.11	61.41	31.37
105.0	59.09	56.50	28.64
110.0	53.51	51.08	25.77
115.0	47.35	45.13	22.76
120.0	40.62	38.67	19.63
125.0	33.44	31.80	16.43
130.0	26.62	25.29	13.48
135.0	19.52	18.54	10.47
140.0	13.33	12.66	7.84
145.0	8.56	8.12	5.73
150.0	5.16	4.90	4.05
155.0	2.64	2.50	2.48
160.0	0.76	0.72	0.81
165.0	0.09	0.08	0.03
170.0	0.07	0.07	0.03

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Miller Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Electric.ddf
Date: December 29, 2014

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 14.81 psia
Flow Rate: 1.73e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.15e+001	9.47e-001
Carbon Dioxide	6.61e+000	1.33e+000
Nitrogen	1.23e-001	1.57e-002
Methane	2.67e+001	1.95e+000
Ethane	2.54e+001	3.49e+000
Propane	1.08e+001	2.17e+000
Isobutane	2.21e+000	5.86e-001
n-Butane	5.00e+000	1.33e+000
Isopentane	1.13e+000	3.71e-001
n-Pentane	1.22e+000	4.00e-001
n-Hexane	5.56e-001	2.19e-001
Cyclohexane	4.17e-001	1.60e-001
Other Hexanes	8.97e-001	3.53e-001
Heptanes	1.39e+000	6.37e-001
Methylcyclohexane	6.88e-001	3.08e-001
2,2,4-Trimethylpentane	6.11e-003	3.19e-003
Benzene	1.18e+000	4.20e-001
Toluene	2.50e+000	1.05e+000
Ethylbenzene	1.59e-001	7.68e-002
Xylenes	1.53e+000	7.43e-001
C8+ Heavies	5.43e-003	4.22e-003
Total Components	100.00	1.66e+001

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Miller Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Electric.ddf
Date: December 29, 2014

FLASH TANK OFF GAS STREAM

Temperature: 130.00 deg. F
Pressure: 84.70 psia
Flow Rate: 1.03e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.08e-001	5.31e-002
Carbon Dioxide	1.57e+000	1.87e+000
Nitrogen	3.38e-001	2.58e-001
Methane	7.27e+001	3.17e+001
Ethane	1.91e+001	1.56e+001
Propane	4.07e+000	4.88e+000
Isobutane	5.49e-001	8.67e-001
n-Butane	9.53e-001	1.50e+000
Isopentane	1.90e-001	3.72e-001
n-Pentane	1.65e-001	3.23e-001
n-Hexane	4.30e-002	1.01e-001
Cyclohexane	7.89e-003	1.80e-002
Other Hexanes	8.97e-002	2.10e-001
Heptanes	5.79e-002	1.58e-001
Methylcyclohexane	1.12e-002	2.98e-002
2,2,4-Trimethylpentane	5.05e-004	1.57e-003
Benzene	3.46e-003	7.35e-003
Toluene	5.75e-003	1.44e-002
Ethylbenzene	3.20e-004	9.22e-004
Xylenes	2.38e-003	6.86e-003
C8+ Heavies	1.23e-003	5.69e-003
Total Components	100.00	5.80e+001

GRI-GLYCalc VERSION 4.0 - CONDENSER CONTROL CURVE EFFICIENCY REPORT

Case Name: Miller Compressor Station - Gas Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Gas.ddf
Date: December 29, 2014

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	95.62	94.83	69.49
45.0	94.79	93.91	68.32
50.0	93.87	92.89	67.16
55.0	92.78	91.70	65.90
60.0	91.54	90.36	64.57
65.0	90.14	88.85	63.17
70.0	88.55	87.17	61.68
75.0	86.75	85.28	60.11
80.0	84.73	83.18	58.44
85.0	82.48	80.87	56.68
90.0	79.74	78.08	54.64
95.0	76.87	75.18	52.62
100.0	73.69	71.98	50.47
105.0	70.15	68.45	48.18
110.0	66.24	64.57	45.76
115.0	61.93	60.31	43.19
120.0	57.22	55.68	40.48
125.0	52.10	50.66	37.62
130.0	46.60	45.27	34.64
135.0	40.77	39.59	31.55
140.0	34.73	33.71	28.38
145.0	28.69	27.83	25.21
150.0	22.87	22.18	22.09
155.0	17.51	16.98	19.04
160.0	12.96	12.57	16.10
165.0	8.74	8.48	12.73
170.0	4.73	4.59	8.29

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Miller Compressor Station - Gas Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Gas.ddf
Date: December 29, 2014

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 14.81 psia
Flow Rate: 1.25e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.15e+001	6.82e-001
Carbon Dioxide	2.25e+000	3.26e-001
Nitrogen	1.50e-001	1.38e-002
Methane	4.32e+001	2.28e+000
Ethane	1.97e+001	1.95e+000
Propane	8.26e+000	1.20e+000
Isobutane	1.62e+000	3.09e-001
n-Butane	3.33e+000	6.37e-001
Isopentane	8.79e-001	2.08e-001
n-Pentane	8.50e-001	2.02e-001
n-Hexane	4.04e-001	1.14e-001
Cyclohexane	3.38e-001	9.36e-002
Other Hexanes	6.67e-001	1.89e-001
Heptanes	1.08e+000	3.56e-001
Methylcyclohexane	5.84e-001	1.88e-001
2,2,4-Trimethylpentane	6.00e-003	2.25e-003
Benzene	1.29e+000	3.30e-001
Toluene	2.42e+000	7.32e-001
Ethylbenzene	1.33e-001	4.65e-002
Xylenes	1.28e+000	4.46e-001
C8+ Heavies	1.26e-002	7.03e-003
Total Components	100.00	1.03e+001

GRI-GLYCalc VERSION 4.0 - STREAM REPORT

Case Name: Miller Compressor Station - Gas Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2015Jan R13 Mod change engines\Miller_GLYCalc_Gas.ddf
Date: December 29, 2014

FLASH TANK OFF GAS STREAM

Temperature: 130.00 deg. F
Pressure: 84.70 psia
Flow Rate: 1.09e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.08e-001	5.60e-001
Carbon Dioxide	3.86e-001	4.88e+000
Nitrogen	2.99e-001	2.41e+000
Methane	8.51e+001	3.93e+002
Ethane	1.07e+001	9.28e+001
Propane	2.25e+000	2.86e+001
Isobutane	2.92e-001	4.88e+000
n-Butane	4.63e-001	7.74e+000
Isopentane	1.10e-001	2.29e+000
n-Pentane	8.64e-002	1.79e+000
n-Hexane	2.43e-002	6.03e-001
Cyclohexane	5.20e-003	1.26e-001
Other Hexanes	5.13e-002	1.27e+000
Heptanes	3.84e-002	1.11e+000
Methylcyclohexane	8.32e-003	2.35e-001
2,2,4-Trimethylpentane	4.26e-004	1.40e-002
Benzene	3.09e-003	6.95e-002
Toluene	5.34e-003	1.42e-001
Ethylbenzene	3.07e-004	9.38e-003
Xylenes	2.31e-003	7.05e-002
C8+ Heavies	3.71e-003	1.82e-001
Total Components	100.00	5.43e+002

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.
Miller Compressor Station
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 Waukesha L5794 GSI Engine w/ NSCR - REMOVED	*EPCE-1*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-2	1.48	6.48	1.81	7.92	0.22	0.95	0.03	0.13	*0.22*	*0.98*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-3	1.48	6.48	1.81	7.92	0.22	0.95	0.03	0.13	*0.22*	*0.98*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-4	1.48	6.48	1.81	7.92	0.22	0.95	0.03	0.13	*0.22*	*0.98*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-5	1.48	6.48	1.81	7.92	0.22	0.95	0.03	0.13	*0.22*	*0.98*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-6	1.48	6.48	1.81	7.92	0.22	0.95	0.03	0.13	*0.22*	*0.98*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-7	1.52	6.66	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-8	1.52	6.66	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-9	1.52	6.66	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-10	1.52	6.66	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-11	1.52	6.66	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - NEW	*EPCE-12*	*1.52*	*6.66*	*1.52*	*6.66*	*1.10*	*4.84*	*0.03*	*0.14*	*0.13*	*0.55*
805-hp Capstone C600 Microturbine Generator	EPGEN-1	0.25	1.09	0.56	2.46	0.01	0.06	0.02	0.09	0.05	0.20
805-hp Capstone C600 Microturbine Generator	EPGEN-2	0.25	1.09	0.56	2.46	0.01	0.06	0.02	0.09	0.05	0.20
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-1*	-	-	-	-	*0.49*	*2.13*	-	-	-	-
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-1	*0.09*	*0.38*	*0.07*	*0.32*	*<0.01*	*0.02*	*<0.01*	*<0.01*	*0.01*	*0.03*
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-2*	-	-	-	-	*0.49*	*2.13*	-	-	-	-
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-2	*0.09*	*0.38*	*0.07*	*0.32*	*<0.01*	*0.02*	*<0.01*	*<0.01*	*0.01*	*0.03*
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-3*	-	-	-	-	*0.49*	*2.13*	-	-	-	-
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-3	*0.09*	*0.38*	*0.07*	*0.32*	*<0.01*	*0.02*	*<0.01*	*<0.01*	*0.01*	*0.03*
3.35-mmBtu/hr Hot Oil Heater - REVISED	EPOH-1	0.29	1.29	0.25	1.08	0.02	0.07	*<0.01*	*<0.01*	*0.02*	*0.10*
Flare	APCFLARE	2.89	0.45	15.62	2.11	18.48	2.43	<0.01	<0.01	<0.01	0.01
Ten (10) 400-bbl Stabilized Condensate Tanks + Two (2) 400-bbl Pipeline Fluids/Water Tanks	EPTK-1 - EPTK-12	-	-	-	-	-	7.24	-	-	-	-
Truck Loading	EPLOAD	-	-	-	-	-	7.61	-	-	-	-
Fugitive Emissions - REVISED	*EP-FUG*	-	-	-	-	-	*8.56*	-	-	-	-
Compressor Blowdowns - ADDED	*EP-BD*	-	-	-	-	*24.93*	*8.23*	-	-	-	-
Proposed Total =		**20.47**	**77.46**	**35.37**	**88.63**	**52.66**	**74.54**	**0.38**	**1.68**	**2.02**	**8.83**
Currently Permitted Total =		**22.87**	**77.47**	**49.09**	**91.54**	**30.05**	**61.98**	**0.38**	**1.66**	**1.90**	**8.34**
Change in Emissions =		**-2.40**	**-0.01**	**-13.72**	**-2.91**	**22.61**	**12.56**	**0.00**	**0.02**	**0.12**	**0.49**

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

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
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 Waukesha L5794 GSI Engine w/ NSCR - REMOVED	*EPCE-1*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-2	0.01	0.01	0.01	<0.01	0.08	0.02	-	<0.01	<0.01	0.13
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-3	0.01	0.01	0.01	<0.01	0.08	0.02	-	<0.01	<0.01	0.13
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-4	0.01	0.01	0.01	<0.01	0.08	0.02	-	<0.01	<0.01	0.13
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-5	0.01	0.01	0.01	<0.01	0.08	0.02	-	<0.01	<0.01	0.13
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-6	0.01	0.01	0.01	<0.01	0.08	0.02	-	<0.01	<0.01	0.13
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-7	0.02	0.01	<0.01	<0.01	*0.31*	0.01	<0.01	<0.01	<0.01	*0.36*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-8	0.02	0.01	<0.01	<0.01	*0.31*	0.01	<0.01	<0.01	<0.01	*0.36*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-9	0.02	0.01	<0.01	<0.01	*0.31*	0.01	<0.01	<0.01	<0.01	*0.36*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-10	0.02	0.01	<0.01	<0.01	*0.31*	0.01	<0.01	<0.01	<0.01	*0.36*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-11	0.02	0.01	<0.01	<0.01	*0.31*	0.01	<0.01	<0.01	<0.01	*0.36*
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - NEW	*EPCE-12*	*0.02*	*0.01*	*<0.01*	*<0.01*	*0.31*	*0.01*	*<0.01*	*<0.01*	*<0.01*	*0.36*
805-hp Capstone C600 Microturbine Generator	EPGEN-1	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	0.01
805-hp Capstone C600 Microturbine Generator	EPGEN-2	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-1*	-	-	*0.02*	*0.00*	-	-	*0.01*	*0.06*	*0.04*	*0.13*
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-2*	-	-	*0.02*	*0.00*	-	-	*0.01*	*0.06*	*0.04*	*0.13*
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-2	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	*EPSTL-3*	-	-	*0.02*	*0.00*	-	-	*0.01*	*0.06*	*0.04*	*0.13*
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-3	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01
3.35-mmBtu/hr Hot Oil Heater - REVISED	EPOH-1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
Flare	APCFLARE	-	-	<0.01	-	<0.01	-	0.28	<0.01	<0.01	0.28
Ten (10) 400-bbl Stabilized Condensate Tanks + Two (2) 400-bbl Pipeline Fluids/Water Tanks	EPTK-1 - EPTK-12	-	-	-	-	-	-	-	-	-	-
Truck Loading	EPLOAD	-	-	-	-	-	-	-	-	-	-
Fugitive Emissions - REVISED	*EP-FUG*	-	-	-	-	-	-	-	-	-	-
Compressor Blowdowns - ADDED	*EP-BD*	-	-	*0.01*	*<0.01*	-	-	*0.26*	*0.02*	*<0.01*	*0.29*
Proposed Total =		0.21	0.15	0.12	<0.01	2.27	0.12	0.59	0.22	0.13	3.81
Currently Permitted Total =		0.20	0.15	0.21	<0.01	1.93	0.13	0.40	0.36	0.16	3.54
Change in Emissions =		0.01	0.00	-0.10	0.00	0.35	-0.01	0.18	-0.14	-0.03	0.26

Appalachia Midstream Services, L.L.C.
Miller 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 Waukesha L5794 GSI Engine w/ NSCR - REMOVED	EPCE-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,380-hp Waukesha L5734 GSI Engine w/ NSCR - REVISED	EPCE-2	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-3	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-4	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-5	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-6	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-7	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-8	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-9	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-10	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-11	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - NEW	EPCE-12	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
805-hp Capstone C800 Microturbine Generator	EPGEN-1	<0.01	<0.01	<0.01	<0.01	0.02	-	-	<0.01	<0.01	0.03
805-hp Capstone C800 Microturbine Generator	EPGEN-2	<0.01	<0.01	<0.01	<0.01	0.02	-	-	<0.01	<0.01	0.03
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-1	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-2	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-2	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-3	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-3	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
3.35-mmBtu/hr Hot Oil Heater - REVISED	EPOH-1	-	-	<0.01	-	<0.01	-	0.02	<0.01	-	0.02
Flare	APCFLARE	-	-	<0.01	-	<0.01	-	0.03	<0.01	<0.01	0.03
Ten (10) 400-bbl Stabilized Condensate Tanks + Two (2) 400-bbl Pipeline Fluids/Water Tanks	EPTK-1 - EPTK-12	-	-	<0.01	<0.01	-	-	0.25	<0.01	<0.01	0.25
Truck Loading	EPLOAD	-	-	0.07	0.01	-	-	0.12	0.10	0.04	0.34
Fugitive Emissions - REVISED	EP-FUG	-	-	<0.01	<0.01	-	-	0.09	0.01	<0.01	0.10
Compressor Blowdowns - ADDED	EP-BD	-	-	<0.01	<0.01	-	-	0.09	0.01	<0.01	0.10
Proposed Total =		0.92	0.67	0.59	0.07	9.96	0.53	0.85	0.96	0.63	15.18
Currently Permitted Total =		0.88	0.66	0.95	0.01	8.44	0.57	0.99	1.64	0.70	14.85
Change in Emissions =		0.04	0.00	-0.36	0.06	1.52	-0.04	-0.14	-0.68	-0.07	0.33

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 Waukesha L5794 GSI Engine w/ NSCR - REMOVED	EPCE-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-2	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-3	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-4	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-5	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-6	0.06	0.06	0.04	<0.01	0.33	0.07	-	0.01	<0.01	0.58
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-7	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-8	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-9	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-10	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-11	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - NEW	EPCE-12	0.10	0.06	0.01	<0.01	1.38	0.03	0.01	<0.01	<0.01	1.59
805-hp Capstone C600 Microturbine Generator	EPGEN-1	<0.01	<0.01	<0.01	<0.01	0.02	-	-	<0.01	<0.01	0.03
805-hp Capstone C600 Microturbine Generator	EPGEN-2	<0.01	<0.01	<0.01	<0.01	0.02	-	-	<0.01	<0.01	0.03
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-1	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-2	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-2	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-3	-	-	0.10	0.02	-	-	0.05	0.25	0.18	0.60
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-3	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	0.01
3.35-mmBtu/hr Hot Oil Heater - REVISED	EPOH-1	-	-	<0.01	-	<0.01	-	0.02	<0.01	-	0.02
Flare	APCFLARE	-	-	<0.01	-	<0.01	-	0.03	<0.01	<0.01	0.03
Ten (10) 400-bbl Stabilized Condensate Tanks + Two (2) 400-bbl Pipeline Fluids/Water Tanks	EPTK-1 - EPTK-12	-	-	<0.01	<0.01	-	-	0.25	<0.01	<0.01	0.25
Truck Loading	EPLOAD	-	-	0.07	0.01	-	-	0.12	0.10	0.04	0.34
Fugitive Emissions - REVISED	EP-FUG	-	-	<0.01	<0.01	-	-	0.09	0.01	<0.01	0.10
Compressor Blowdowns - ADDED	EP-BD	-	-	<0.01	<0.01	-	-	0.09	0.01	<0.01	0.10
	Proposed Total =	0.92	0.67	0.59	0.07	9.96	0.53	0.85	0.96	0.63	15.18
	Currently Permitted Total =	0.88	0.66	0.95	0.01	8.44	0.57	0.99	1.64	0.70	14.85
	Change in Emissions =	0.04	0.00	-0.36	0.06	1.52	-0.04	-0.14	-0.68	-0.07	0.33

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Summary of Greenhouse Gas Emissions

Equipment	Point ID	Carbon Dioxide (CO_2)		Methane (CH_4)		Nitrous Oxide (N_2O)		Methane (CH_4) as CO_2e		Nitrous Oxide (N_2O) as CO_2e		Total CO_2 + CO_2e	
		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 Waukesha L5794 GSI Engine w/ NSCR - REMOVED	EPCE-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-2	1,212.33	4,817.14	0.02	0.09	<0.01	0.01	0.57	2.27	0.68	2.71	1,213.58	4,822.12
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-3	1,212.33	4,817.14	0.02	0.09	<0.01	0.01	0.57	2.27	0.68	2.71	1,213.58	4,822.12
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-4	1,212.33	4,817.14	0.02	0.09	<0.01	0.01	0.57	2.27	0.68	2.71	1,213.58	4,822.12
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-5	1,212.33	4,817.14	0.02	0.09	<0.01	0.01	0.57	2.27	0.68	2.71	1,213.58	4,822.12
1,380-hp Waukesha L5794 GSI Engine w/ NSCR - REVISED	EPCE-6	1,212.33	4,817.14	0.02	0.09	<0.01	0.01	0.57	2.27	0.68	2.71	1,213.58	4,822.12
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-7	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REVISED	EPCE-8	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-9	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-10	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - REPLACED	EPCE-11	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
1,380-hp Caterpillar G3516B Engine w/Oxid. Cat. - NEW	EPCE-12	1,536.38	6,104.74	0.03	0.10	<0.01	0.01	0.63	2.49	0.75	2.96	1,537.75	6,110.19
805-hp Capstone C600 Microturbine Generator	EPGEN-1	800.13	3,179.30	0.02	0.06	<0.01	0.01	0.38	<0.01	0.45	<0.01	800.96	3,179.30
805-hp Capstone C600 Microturbine Generator	EPGEN-2	800.13	3,179.30	0.02	0.06	<0.01	0.01	0.38	<0.01	0.45	<0.01	800.96	3,179.30
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-1	<0.01	<0.01	0.11	0.45	-	-	2.85	11.31	-	-	2.85	11.31
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-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
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-2	<0.01	<0.01	0.11	0.45	-	-	2.85	11.31	-	-	2.86	11.31
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-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
53.8-MMSCFD TEG Dehydration Unit Still Vent - REVISED	EPSTL-3	<0.01	<0.01	0.11	0.45	-	-	2.85	11.31	-	-	2.85	11.31
1.0-mmBtu/hr Reboiler - REVISED	EPREBL-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
3.35-mmBtu/hr Hot Oil Heater - REVISED	EPOH-1	391.87	1,557.10	0.01	0.03	<0.01	<0.01	0.18	0.73	0.22	0.87	392.28	1,558.70
Flare	APCFLARE	29.72	80.59	11.18	1.47	<0.01	<0.01	279.42	36.75	0.01	0.04	309.14	117.39
Ten (10) 400-bbl Stabilized Condensate Tanks + Two (2) 400-bbl Pipeline Fluids/Water Tanks	EPTK-1 - EPTK-12	0.02	0.08	0.39	1.54	-	-	9.59	38.51	-	-	9.71	38.59
Truck Loading	EPLOAD	-	0.01	-	0.52	-	-	-	13.00	-	-	-	13.01
Fugitive Emissions - REVISED	EP-FUG	-	0.41	-	98.66	-	-	-	2,466.44	-	-	-	2,466.86
Compressor Blowdowns - ADDED	EP-BD	1.33	0.40	239.01	71.55	-	-	5,975.26	1,971.83	-	-	5,976.58	1,972.23
Proposed Total =		17,654.03	70,105.74	251.22	176.32	0.03	0.13	6,280.62	4,5[illegible]3.12	9.21	33.01	23,943.97	74,726.[illegible]3
Currently Permitted Total =		17,336.65	68,790.85	34.22	102.98	0.03	0.13	718.56	2,160.09	9.49	34.00	18,064.80	70,984.94
Change in Emissions =		317.38	1,314.[illegible]	217.01	73.34	0.00	0.00	5,562.07	2,428.03	-0.29	-0.99	5,879.17	3,741.94

API Chapter 5: Emissions from working and breathing losses are very small in production and virtually non-existent in the downstream segments. Unless site-specific data indicate otherwise, working and breathing losses from "weathered" crude and other refined petroleum products are assumed to contain no CH_4 or CO_2.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Criteria Air Pollutants (1 of 2)

Equipment Information

Point ID:	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Waukesha	Waukesha	Waukesha	Waukesha	Waukesha
Model:	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI
Design Class:	4S-RB	4S-RB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	NSCR	NSCR	NSCR
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	7,510	7,510	7,510	7,510	7,510
Fuel Use (scfh)[1]:	10,364	10,364	10,364	10,364	10,364
Fuel Use (mmBtu/hr):	10.36	10.36	10.36	10.36	10.36
Exhaust Flow (acfm):	6,525	6,525	6,525	6,525	6,525
Exhaust Temp (°F):	1,149	1,149	1,149	1,149	1,149
Operating Hours:	8,760	8,760	8,760	8,760	8,760
Fuel HHV (Btu/scf):	1,138	1,138	1,138	1,138	1,138
Uncontrolled Emission Factors[1]					
NOx (g/hp-hr):	13.90	13.90	13.90	13.90	13.90
CO (g/hp-hr):	8.80	8.80	8.80	8.80	8.80
VOC (g/hp-hr):	0.30	0.30	0.30	0.30	0.30
Controlled Emission Factors					
NOx Control Eff. %	96.50%	96.50%	96.50%	96.50%	96.50%
CO Control Eff. %	93.25%	93.25%	93.25%	93.25%	93.25%
VOC Control Eff. %	84.50%	84.50%	84.50%	84.50%	84.50%
NOx (g/hp-hr):	0.49	0.49	0.49	0.49	0.49
CO (g/hp-hr):	0.59	0.59	0.59	0.59	0.59
VOC (g/hp-hr):	0.05	0.05	0.05	0.05	0.05

Uncontrolled Criteria Air Pollutant Emissions[2]

Point ID:	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
NOx	42.29	185.22	42.29	185.22	42.29	185.22	42.29	185.22	42.29	185.22
CO	26.77	117.26	26.77	117.26	26.77	117.26	26.77	117.26	26.77	117.26
VOC	0.91	4.00	0.91	4.00	0.91	4.00	0.91	4.00	0.91	4.00
SO_2	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13
$PM_{10/2.5}$	0.11	0.48	0.11	0.48	0.11	0.48	0.11	0.48	0.11	0.48
PM_{COND}	0.11	0.50	0.11	0.50	0.11	0.50	0.11	0.50	0.11	0.50
PM_{TOT}	0.22	0.98	0.22	0.98	0.22	0.98	0.22	0.98	0.22	0.98

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Criteria Air Pollutants (Continued)

Controlled Criteria Air Pollutant Emissions[2]

Point ID:	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**
NOx	1.48	6.48	1.48	6.48	1.48	6.48	1.48	6.48	1.48	6.48
CO	1.81	7.92	1.81	7.92	1.81	7.92	1.81	7.92	1.81	7.92
VOC	0.14	0.62	0.14	0.62	0.14	0.62	0.14	0.62	0.14	0.62
SO_2	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13
$PM_{10/2.5}$	0.11	0.48	0.11	0.48	0.11	0.48	0.11	0.48	0.11	0.48
PM_{COND}	0.11	0.50	0.11	0.50	0.11	0.50	0.11	0.50	0.11	0.50
PM_{TOT}	0.22	0.98	0.22	0.98	0.22	0.98	0.22	0.98	0.22	0.98

AP-42 Emission Factors (lb/mmBtu)[3]

	4S-RB
Pollutant	**3.2-3 (7/00)**
$PM_{10/2.5}$	9.50E-03
PM_{COND}	9.91E-03
PM_{TOT}	1.94E-02

Notes:
1) Increasing the HHV decreases estimated fuel use. AMS requests to retain current fuel use limitations to be conservative.
2) NOx, CO, VOC: Manufacturer data. SO_2: Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel. PM: AP-42 factor adjusted using HHV.

3) All particulate matter (PM) - total, condensable and filterable - resulting from combustion of natural gas is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Hazardous Air Pollutants (1 of 2)

Equipment Information

Point ID:	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Waukesha	Waukesha	Waukesha	Waukesha	Waukesha
Model:	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI
Design Class:	4S-RB	4S-RB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	NSCR	NSCR	NSCR
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	7,510	7,510	7,510	7,510	7,510
Fuel Use (scfh):	10,364	10,364	10,364	10,364	10,364
Fuel Use (mmBtu/hr):	10.36	10.36	10.36	10.36	10.36
Exhaust Flow (acfm):	6,525	6,525	6,525	6,525	6,525
Exhaust Temp (°F):	1,149	1,149	1,149	1,149	1,149
Operating Hours:	8,760	8,760	8,760	8,760	8,760
HAP Control Eff. %	50.00%	50.00%	50.00%	50.00%	50.00%

Uncontrolled Hazardous Air Pollutant (HAP) Emissions

Point ID:	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
Acetaldehyde	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13	0.03	0.13
Acrolein	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12
Benzene	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.07
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	0.15	0.67	0.15	0.67	0.15	0.67	0.15	0.67	0.15	0.67
n-Hexane	-	-	-	-	-	-	-	-	-	-
Methanol	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
Toluene	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
Xylenes	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Total HAPs =	**0.26**	**1.16**	**0.26**	**1.16**	**0.26**	**1.16**	**0.26**	**1.16**	**0.26**	**1.16**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Hazardous Air Pollutants (Continued)

Controlled Hazardous Air Pollutant (HAP) Emissions

Point ID:	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
Acetaldehyde	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Acrolein	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Benzene	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.04
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Formaldehyde	0.08	0.33	0.08	0.33	0.08	0.33	0.08	0.33	0.08	0.33
n-Hexane	-	-	-	-	-	-	-	-	-	-
Methanol	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.07	0.02	0.07
Toluene	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Xylenes	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAPs =	**0.13**	**0.58**	**0.13**	**0.58**	**0.13**	**0.58**	**0.13**	**0.58**	**0.13**	**0.58**

AP-42 Emission Factors (lb/mmBtu)

	4S-RB
Pollutant	3.2-3 (7/00)
Acetaldehyde	2.79E-03
Acrolein	2.63E-03
Benzene	1.58E-03
Ethylbenzene	2.18E-05
Formaldehyde	2.05E-02
n-Hexane	NA
Methanol	3.06E-03
Toluene	5.58E-04
Xylenes	1.95E-04

Manufacturer data for formaldehyde (g/hp-hr): 0.05

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Greenhouse Gas Emissions (1 of 2)

Equipment Information

Point ID:	EPCE-2	EPCE-3	EPCE-4	EPCE-5	EPCE-6
Make:	Waukesha	Waukesha	Waukesha	Waukesha	Waukesha
Model:	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI	L5794 GSI
Design Class:	4S-RB	4S-RB	4S-RB	4S-RB	4S-RB
Controls:	NSCR	NSCR	NSCR	NSCR	NSCR
Horsepower (hp):	1,380	1,380	1,380	1,380	1,380
Fuel Use (Btu/hp-hr):	7,510	7,510	7,510	7,510	7,510
Fuel Use (scfh):	10,364	10,364	10,364	10,364	10,364
Fuel Use (mmBtu/hr):	10.36	10.36	10.36	10.36	10.36
Exhaust Flow (acfm):	6,525	6,525	6,525	6,525	6,525
Exhaust Temp (°F):	1,149	1,149	1,149	1,149	1,149
Operating Hours:	8,760	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions

Point ID:	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
CO_2	1,212.33	4,817.14	1,212.33	4,817.14	1,212.33	4,817.14	1,212.33	4,817.14	1,212.33	4,817.14
CH_4	0.02	0.09	0.02	0.09	0.02	0.09	0.02	0.09	0.02	0.09
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	0.57	2.27	0.57	2.27	0.57	2.27	0.57	2.27	0.57	2.27
N_2O as CO_2e	0.68	2.71	0.68	2.71	0.68	2.71	0.68	2.71	0.68	2.71
Total CO_2 + CO_2e	1,213.58	4,822.12	1,213.58	4,822.12	1,213.58	4,822.12	1,213.58	4,822.12	1,213.58	4,822.12

Point ID:	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
CO_2	1,212.33	5,309.99	1,212.33	5,309.99	1,212.33	5,309.99	1,212.33	5,309.99	1,212.33	5,309.99
CH_4	0.02	0.10	0.02	0.10	0.02	0.10	0.02	0.10	0.02	0.10
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	0.57	2.50	0.57	2.50	0.57	2.50	0.57	2.50	0.57	2.50
N_2O as CO_2e	0.68	2.98	0.68	2.98	0.68	2.98	0.68	2.98	0.68	2.98
Total CO_2 + CO_2e	1,213.58	5,315.47	1,213.58	5,315.47	1,213.58	5,315.47	1,213.58	5,315.47	1,213.58	5,315.47

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.
Miller Compressor Station
Engine Emissions Calculations - Criteria Air Pollutants (2 of 2)

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):	8,226	8,226	8,226	8,226	8,226	8,226
Fuel Use (scfh)[1]:	10,020	10,020	10,020	10,020	10,020	10,020
Fuel Use (mmBtu/hr):	11.35	11.35	11.35	11.35	11.35	11.35
Exhaust Flow (acfm):	9,156	9,156	9,156	9,156	9,156	9,156
Exhaust Temp (°F):	995	995	995	995	995	995
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760
Fuel HHV (Btu/scf):	1,138	1,138	1,138	1,138	1,138	1,138
Uncontrolled Emission Factors						
NOx (g/hp-hr):	0.50	0.50	0.50	0.50	0.50	0.50
CO (g/hp-hr):	2.71	2.71	2.71	2.71	2.71	2.71
VOC (g/hp-hr):	0.48	0.48	0.48	0.48	0.48	0.48
Controlled Emission Factors						
NOx Control Eff. %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO Control Eff. %	82.00%	82.00%	82.00%	82.00%	82.00%	82.00%
VOC Control Eff. %	45.00%	45.00%	45.00%	45.00%	45.00%	45.00%
NOx (g/hp-hr):	0.50	0.50	0.50	0.50	0.50	0.50
CO (g/hp-hr):	0.50	0.50	0.50	0.50	0.50	0.50
VOC (g/hp-hr):	0.26	0.26	0.26	0.26	0.26	0.26

Uncontrolled Criteria Air Pollutant Emissions[2]

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	8.24	36.11	8.24	36.11	8.24	36.11	8.24	36.11	8.24	36.11	8.24	36.11
VOC	1.46	6.40	1.46	6.40	1.46	6.40	1.46	6.40	1.46	6.40	1.46	6.40
SO_2	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
$PM_{10/2.5}$	<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}	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55
PM_{TOT}	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Criteria Air Pollutants (Continued)

Controlled Criteria Air Pollutant Emissions[2]

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
NO_x	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	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66	1.52	6.66
VOC	0.79	3.46	0.79	3.46	0.79	3.46	0.79	3.46	0.79	3.46	0.79	3.46
SO_2	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14	0.03	0.14
$PM_{10/2.5}$	<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}	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55
PM_{TOT}	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55	0.13	0.55

AP-42 Emission Factors (lb/mmBtu)[3]

	4S-RB
Pollutant	3.2-3 (7/00)
$PM_{10/2.5}$	9.50E-03
PM_{COND}	9.91E-03
PM_{TOT}	1.94E-02

Notes;

1) Increasing the HHV decreases estimated fuel use. AMS requests to retain current fuel use limitations to be conservative.

2) NOx, CO, VOC: Manufacturer data. SO_2: Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel. PM: AP-42 factor adjusted using HHV.

3) All particulate matter (PM) - total, condensable and filterable - resulting from combustion of natural gas is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Hazardous Air Pollutants (2 of 2)

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):	8,226	8,226	8,226	8,226	8,226	8,226
Fuel Use (scfh):	10,020	10,020	10,020	10,020	10,020	10,020
Fuel Use (mmBtu/hr):	11.35	11.35	11.35	11.35	11.35	11.35
Exhaust Flow (acfm):	9,156	9,156	9,156	9,156	9,156	9,156
Exhaust Temp (°F):	995	995	995	995	995	995
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760
HAP Control Eff. %	76.00%	76.00%	76.00%	76.00%	76.00%	76.00%

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	0.09	0.42	0.09	0.42	0.09	0.42	0.09	0.42	0.09	0.42	0.09	0.42
Acrolein	0.06	0.26	0.06	0.26	0.06	0.26	0.06	0.26	0.06	0.26	0.06	0.26
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	1.31	5.73	1.31	5.73	1.31	5.73	1.31	5.73	1.31	5.73	1.31	5.73
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	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12	0.03	0.12
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 =	**1.51**	**6.63**	**1.51**	**6.63**	**1.51**	**6.63**	**1.51**	**6.63**	**1.51**	**6.63**	**1.51**	**6.63**

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
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	0.02	0.10	0.02	0.10	0.02	0.10	0.02	0.10	0.02	0.10	0.02	0.10
Acrolein	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.06
Benzene	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
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	0.31	1.38	0.31	1.38	0.31	1.38	0.31	1.38	0.31	1.38	0.31	1.38
n-Hexane	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01
Methanol	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
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 =	**0.36**	**1.59**	**0.36**	**1.59**	**0.36**	**1.59**	**0.36**	**1.59**	**0.36**	**1.59**	**0.36**	**1.59**

AP-42 Emission Factors (lb/mmBtu)

	4S-LB
Pollutant	3.2-2 (7/00)
Acetaldehyde	8.36E-03
Acrolein	5.14E-03
Benzene	4.40E-04
Ethylbenzene	3.97E-05
Formaldehyde	5.28E-02
n-Hexane	1.11E-03
Methanol	2.50E-03
Toluene	4.08E-04
Xylenes	1.84E-04

Manufacturer data for formaldehyde (g/hp-hr): 0.43

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Greenhouse Gas Emissions (2 of 2)

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):	8,226	8,226	8,226	8,226	8,226	8,226
Fuel Use (scfh):	10,020	10,020	10,020	10,020	10,020	10,020
Fuel Use (mmBtu/hr):	11.35	11.35	11.35	11.35	11.35	11.35
Exhaust Flow (acfm):	9,156	9,156	9,156	9,156	9,156	9,156
Exhaust Temp (°F):	995	995	995	995	995	995
Operating Hours:	8,760	8,760	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions

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	1,536.38	6,104.74	1,536.38	6,104.74	1,536.38	6,104.74	1,536.38	6,104.74	1,536.38	6,104.74	1,536.38	6,104.74
CH_4	0.03	0.10	0.03	0.10	0.03	0.10	0.03	0.10	0.03	0.10	0.03	0.10
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	0.63	2.49	0.63	2.49	0.63	2.49	0.63	2.49	0.63	2.49	0.63	2.49
N_2O as CO_2e	0.75	2.96	0.75	2.96	0.75	2.96	0.75	2.96	0.75	2.96	0.75	2.96
Total CO_2 + CO_2e	1,537.75	6,110.19	1,537.75	6,110.19	1,537.75	6,110.19	1,537.75	6,110.19	1,537.75	6,110.19	1,537.75	6,110.19

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	1,536.38	6,729.32	1,536.38	6,729.32	1,536.38	6,729.32	1,536.38	6,729.32	1,536.38	6,729.32	1,536.38	6,729.32
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	0.63	2.74	0.63	2.74	0.63	2.74	0.63	2.74	0.63	2.74	0.63	2.74
N_2O as CO_2e	0.75	3.27	0.75	3.27	0.75	3.27	0.75	3.27	0.75	3.27	0.75	3.27
Total CO_2 + CO_2e	1,537.75	6,735.33	1,537.75	6,735.33	1,537.75	6,735.33	1,537.75	6,735.33	1,537.75	6,735.33	1,537.75	6,735.33

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)

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

Note: Manufacturer data available for CO_2 emissions from Caterpillar engines: 505 g/hp-hr

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Generator Emissions Calculations - Criteria Air Pollutants

Equipment Information

	EPGEN-1	EPGEN-2
Point ID:	EPGEN-1	EPGEN-2
Make:	Capstone	Capstone
Model:	C600	C600
Design Class:	Turbine	Turbine
Controls:	None	None
Horsepower (hp):	805	805
Fuel Use (Btu/hp-hr):	8,497	8,497
Fuel Use (scfh):	5,672	5,672
Fuel Use (mmBtu/hr):	6.84	6.84
Operating Hours:	8,760	8,760
Fuel HHV (Btu/scf):	1,206	1,206

Emission Factors

NOx (g/hp-hr):	0.14	0.14
CO (g/hp-hr):	AP-42	AP-42
VOC (g/hp-hr):	AP-42	AP-42

Criteria Air Pollutant Emissions

Point ID:	EPGEN-1		EPGEN-2	
Pollutant	lb/hr	tons/yr	lb/hr	tons/yr
NOx	0.25	1.09	0.25	1.09
CO	0.56	2.46	0.56	2.46
VOC	0.01	0.06	0.01	0.06
SO_2	0.02	0.09	0.02	0.09
$PM_{10/2.5}$	0.01	0.06	0.01	0.06
PM_{COND}	0.03	0.14	0.03	0.14
PM_{TOT}	0.05	0.20	0.05	0.20

Emission Factors (lb/mmBtu)

Pollutant	3.1-1, 3.1-2a (4/00)
CO	8.20E-02
VOC	2.10E-03
$PM_{10/2.5}$	1.90E-03
PM_{COND}	4.70E-03
PM_{TOT}	6.60E-03

Emission Factor Sources:

NOx: Manufacturer data. SO_2: Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel. CO, VOC and PM: AP-42.

Note: All particulate matter (PM) - total, condensable and filterable - resulting from combustion of natural gas is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Generator Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPGEN-1	EPGEN-2
Make:	Capstone	Capstone
Model:	C600	C600
Design Class:	Turbine	Turbine
Controls:	None	None
Horsepower (hp):	805	805
Fuel Use (Btu/hp-hr):	8,497	8,497
Fuel Use (scfh):	5,672	5,672
Fuel Use (mmBtu/hr):	6.84	6.84
Operating Hours:	8,760	8,760

Hazardous Air Pollutant Emissions

Point ID:	EPGEN-1		EPGEN-2	
Pollutant	lb/hr	tons/yr	lb/hr	tons/yr
Acetaldehyde	<0.01	<0.01	<0.01	<0.01
Acrolein	<0.01	<0.01	<0.01	<0.01
Benzene	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	<0.01	<0.01	<0.01	<0.01
Formaldehyde	<0.01	0.02	<0.01	0.02
Methanol	-	-	-	-
Toluene	<0.01	<0.01	<0.01	<0.01
Xylenes	<0.01	<0.01	<0.01	<0.01
Total HAPs	**0.01**	**0.03**	**0.01**	**0.03**

AP-42 Emission Factors (lb/mmBtu)

Pollutant	3.1-1, 3.1-2a (4/00)
Acetaldehyde	4.00E-05
Acrolein	6.40E-06
Benzene	1.20E-05
Ethylbenzene	3.20E-05
Formaldehyde	7.10E-04
Methanol	NA
Toluene	1.30E-04
Xylenes	6.40E-05
Total HAPs	1.03E-03

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Engine Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPGEN-1	EPGEN-2
Make:	Capstone	Capstone
Model:	C600	C600
Design Class:	Turbine	Turbine
Controls:	None	None
Horsepower (hp):	805	805
Fuel Use (Btu/hp-hr):	8,497	8,497
Fuel Use (scfh):	5,672	5,672
Fuel Use (mmBtu/hr):	6.84	6.84
Operating Hours:	8,760	8,760

Greenhouse Gas (GHG) Emissions

Point ID: EPGEN-1 EPGEN-2

Pollutant	EPGEN-1 lb/hr	EPGEN-1 tonnes/yr	EPGEN-2 lb/hr	EPGEN-2 tonnes/yr
CO_2	800.13	3,179.30	800.13	3,179.30
CH_4	0.02	0.06	0.02	0.06
N_2O	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.38	<0.01	0.38	<0.01
N_2O as CO_2e	0.45	<0.01	0.45	<0.01
Total $CO_2 + CO_2e$	**800.96**	**3,179.30**	**800.96**	**3,179.30**

Point ID: EPGEN-1 EPGEN-2

Pollutant	EPGEN-1 lb/hr	EPGEN-1 tons/yr	EPGEN-2 lb/hr	EPGEN-2 tons/yr
CO_2	800.13	3,504.58	800.13	3,504.58
CH_4	0.02	0.07	0.02	0.07
N_2O	<0.01	0.01	<0.01	0.01
CH_4 as CO_2e	0.38	<0.01	0.38	<0.01
N_2O as CO_2e	0.45	<0.01	0.45	<0.01
Total $CO_2 + CO_2e$	**800.96**	**3,504.58**	**800.96**	**3,504.58**

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.
Miller Compressor Station
Glycol Dehydration Unit Emissions

Equipment Information

Parameter	Units	Value	Value	Value
Point ID:	-	EPSTL-1	EPSTL-2	EPSTL-3
Maximum Throughput	MMSCFD	53.80	53.80	53.80
Operating Hours	Hours/Year	8,760	8,760	8,760
Wet Gas Temperature	°F	50	50	50
Wet Gas Pressure	psig	1,440	1,440	1,440
Wet Gas Water Content	lb H_2O/MMSCF	Saturated	Saturated	Saturated
Dry Gas Water Content	lb H_2O/MMSCF	7.00	7.00	7.00
Pump Type	Electric/Gas	See Note	See Note	See Note
Lean Glycol Flow Rate	gpm	15.00	15.00	15.00
Flash Tank Temperature	°F	130	130	130
Flash Tank Pressure	psig	70	70	70
Flash Tank Controls	-	Recycle/ Recompress	Recycle/ Recompress	Recycle/ Recompress
Stripping Gas Flow Rate	scfm	N/A	N/A	N/A
Regenerator Still Vent Controls	-	Condenser/ Combustion	Condenser/ Combustion	Condenser/ Combustion
Condenser Temperature	°F	120	120	120
Condenser Pressure	psig	14.80	14.80	14.80

1) Units are equipped with both a primary electric pump and two Kimray 45015 PV gas injection pump to be used as backups. The electric pump result in higher emissions; therefore, emissions have been modeled assuming use of the electric pump for a more conservative (higher) emissions estimate.

2) Non-condensables from the condenser vent stream and flash tank off-gases will be burned by the reboiler as fuel during typical operating conditions; therefore, these emissions are accounted for in the reboiler calculations. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum; therefore, a closed system with 100% control efficiency for flash tank off-gases was used in GRI-GLYCalc to reflect these operating conditions. During upset conditions, excess flash gas may be routed to the flare and combusted, where emissions would be accounted for in the flare calculations.

3) GRI-GLYCalc Reports attached. 10% safety factor added to GRI-GLYCalc results (TPY) to account for potential fluctuations in gas composition. Gas pump emissions scenario shown for reference only.

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Glycol Dehydration Unit Emissions (Continued)

Proposed Emissions

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
n-Hexane	0.01	0.05	0.01	0.05	0.01	0.05
Benzene	0.02	0.10	0.02	0.10	0.02	0.10
Toluene	0.06	0.25	0.06	0.25	0.06	0.25
Ethylbenzene	0.00	0.02	0.00	0.02	0.00	0.02
Xylenes	0.04	0.18	0.04	0.18	0.04	0.18
Total HAPs =	**0.14**	**0.60**	**0.14**	**0.60**	**0.14**	**0.60**
Total VOC =	**0.49**	**2.13**	**0.49**	**2.13**	**0.49**	**2.13**

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Table 4a: Glycol Dehydration Unit Emissions (Continued)

GRI-GLYCalc Results - Uncontrolled Emissions (Electric Pump)

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
2, 2, 4-Trimethylpentane	0.0038	0.0168	0.0038	0.0168	0.0038	0.0168
n-Hexane	0.2348	1.0282	0.2348	1.0282	0.2348	1.0282
Benzene	0.4807	2.1056	0.4807	2.1056	0.4807	2.1056
Toluene	1.4812	6.4875	1.4812	6.4875	1.4812	6.4875
Ethylbenzene	0.1649	0.7221	0.1649	0.7221	0.1649	0.7221
Xylenes	1.7372	7.6088	1.7372	7.6088	1.7372	7.6088
Total HAPs =	**4.1026**	**17.9690**	**4.1026**	**17.9690**	**4.1026**	**17.9690**
Total VOC =	**10.9975**	**48.1692**	**10.9975**	**48.1692**	**10.9975**	**48.1692**

GRI-GLYCalc Results - Controlled Emissions (Electric Pump)

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
2, 2, 4-Trimethylpentane	0.0002	0.0007	0.0002	0.0007	0.0002	0.0007
n-Hexane	0.0109	0.0479	0.0109	0.0479	0.0109	0.0479
Benzene	0.0210	0.0920	0.0210	0.0920	0.0210	0.0920
Toluene	0.0525	0.2297	0.0525	0.2297	0.0525	0.2297
Ethylbenzene	0.0038	0.0168	0.0038	0.0168	0.0038	0.0168
Xylenes	0.0371	0.1626	0.0371	0.1626	0.0371	0.1626
Total HAPs =	**0.1255**	**0.5497**	**0.1255**	**0.5497**	**0.1255**	**0.5497**
Total VOC =	**0.4415**	**1.9339**	**0.4415**	**1.9339**	**0.4415**	**1.9339**

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Table 4a: Glycol Dehydration Unit Emissions (Continued)

GRI-GLYCalc Results - Uncontrolled Emissions (Gas Pump) - For Reference Only

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
2, 2, 4-Trimethylpentane	0.0032	0.0142	0.0032	0.0142	0.0032	0.0142
n-Hexane	0.1326	0.5809	0.1326	0.5809	0.1326	0.5809
Benzene	0.4287	1.8777	0.4287	1.8777	0.4287	1.8777
Toluene	1.3779	6.0353	1.3779	6.0353	1.3779	6.0353
Ethylbenzene	0.1591	0.6971	0.1591	0.6971	0.1591	0.6971
Xylenes	1.6955	7.4265	1.6955	7.4265	1.6955	7.4265
Total HAPs =	**3.7970**	**16.6317**	**3.7970**	**16.6317**	**3.7970**	**16.6317**
Total VOC =	**8.5238**	**37.3344**	**8.5238**	**37.3344**	**8.5238**	**37.3344**

GRI-GLYCalc Results - Controlled Emissions (Gas Pump) - For Reference Only

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
2, 2, 4-Trimethylpentane	0.0001	0.0005	0.0001	0.0005	0.0001	0.0005
n-Hexane	0.0057	0.0250	0.0057	0.0250	0.0057	0.0250
Benzene	0.0165	0.0723	0.0165	0.0723	0.0165	0.0723
Toluene	0.0366	0.1602	0.0366	0.1602	0.0366	0.1602
Ethylbenzene	0.0023	0.0102	0.0023	0.0102	0.0023	0.0102
Xylenes	0.0223	0.0977	0.0223	0.0977	0.0223	0.0977
Total HAPs =	**0.0835**	**0.3659**	**0.0835**	**0.3659**	**0.0835**	**0.3659**
Total VOC =	**0.2529**	**1.1076**	**0.2529**	**1.1076**	**0.2529**	**1.1076**

Equipment Information

Parameter	Units	Value	Value	Value
Point ID:	-	EPSTL-1	EPSTL-2	EPSTL-3
Maximum Throughput	MMSCFD	53.8	53.8	53.8
Operating Hours	Hours/Year	8,760	8,760	8,760
Wet Gas Temperature	°F	50	50	50
Wet Gas Pressure	psig	1,440	1,440	1,440
Wet Gas Water Content	lb H_2O/MMSCF	Saturated	Saturated	Saturated
Dry Gas Water Content	lb H_2O/MMSCF	7.00	7.00	7.00
Pump Type	Electric/Gas	See Note	See Note	See Note
Lean Glycol Flow Rate	gpm	15.00	15.00	15.00
Flash Tank Temperature	°F	130	130	130
Flash Tank Pressure	psig	70	70	70
Flash Tank Controls	Yes/No	Recycle/ Recompress	Recycle/ Recompress	Recycle/ Recompress
Stripping Gas Flow Rate	scfm	N/A	N/A	N/A
Regenerator Still Vent Controls	Yes/No	Condenser/ Combustion	Condenser/ Combustion	Condenser/ Combustion
Condenser Temperature	°F	120	120	120
Condenser Pressure	psig	14.80	14.80	14.80

Note: Units are equipped with both a primary electric pump and two Kimray 45015 PV gas injection pump to be used as backups. The gas pumps result in higher GHG emissions; therefore, GHG emissions have been modeled assuming use of the gas pumps for a more conservative (higher) emissions estimate.

Source: CH_4: GRI-GLYCalc™ Report(s) attached. CO_2: Mass Balance.

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

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

Input CH_4 wt% from gas analysis =	**86.9600**
Input CO_2 wt% from gas analysis =	**0.1760**

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Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Glycol Dehydration Unit Emissions - Greenhouse Gas Emissions (Continued)

Uncontrolled Emissions (Gas Pump)

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2 =	0.0127	0.0504	0.0127	0.0504	0.0127	0.0504
CH_4 =	2.2779	9.0513	2.2779	9.0513	2.2779	9.0513
CH_4 as CO_2e =	56.9475	226.2814	56.9475	226.2814	56.9475	226.2814
Total CO_2 + CO_2e =	56.9602	226.3317	56.9602	226.3317	56.9602	226.3317

Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
CO_2 =	0.0127	0.0555	0.0127	0.0555	0.0127	0.0555
Input CH_4 from GLYCalc =	**2.2779**	**9.9773**	**2.2779**	**9.9773**	**2.2779**	**9.9773**
CH_4 as CO_2e =	56.9475	249.4325	56.9475	249.4325	56.9475	249.4325
Total CO_2 + CO_2e =	56.9602	249.4880	56.9602	249.4880	56.9602	249.4880

Controlled Emissions (Gas Pump)

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2 =	0.0006	0.0025	0.0006	0.0025	0.0006	0.0025
CH_4 =	0.1139	0.4524	0.1139	0.4524	0.1139	0.4524
CH_4 as CO_2e =	2.8475	11.3103	2.8475	11.3103	2.8475	11.3103
Total CO_2 + CO_2e =	2.8481	11.3128	2.8481	11.3128	2.8481	11.3128

Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
CO_2 =	0.0006	0.0028	0.0006	0.0028	0.0006	0.0028
Input CH_4 from GLYCalc =	**0.1139**	**0.4987**	**0.1139**	**0.4987**	**0.1139**	**0.4987**
CH_4 as CO_2e =	2.8475	12.4675	2.8475	12.4675	2.8475	12.4675
Total CO_2 + CO_2e =	2.8481	12.4703	2.8481	12.4703	2.8481	12.4703

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

Uncontrolled Emissions (Electric Pump) - For Reference Only

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2 =	0.0109	0.0432	0.0109	0.0432	0.0109	0.0432
CH_4 =	1.9513	7.7534	1.9513	7.7534	1.9513	7.7534
CH_4 as CO_2e =	48.7825	193.8359	48.7825	193.8359	48.7825	193.8359
Total CO_2 + CO_2e =	48.7934	193.8790	48.7934	193.8790	48.7934	193.8790

Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
CO_2 =	0.0109	0.0476	0.0109	0.0476	0.0109	0.0476
Input CH_4 from GLYCalc =	1.9513	8.5467	1.9513	8.5467	1.9513	8.5467
CH_4 as CO_2e =	48.7825	213.6675	48.7825	213.6675	48.7825	213.6675
Total CO_2 + CO_2e =	48.7934	213.7151	48.7934	213.7151	48.7934	213.7151

Controlled Emissions (Electric Pump) - For Reference Only

Point ID:	EPSTL-1		EPSTL-2		EPSTL-3	
Pollutant	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**	**lb/hr**	**tonnes/yr**
CO_2 =	0.0005	0.0022	0.0005	0.0022	0.0005	0.0022
CH_4 =	0.0975	0.3876	0.0975	0.3876	0.0975	0.3876
CH_4 as CO_2e =	2.4375	9.6910	2.4375	9.6910	2.4375	9.6910
Total CO_2 + CO_2e =	2.4380	9.6932	2.4380	9.6932	2.4380	9.6932

Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
CO_2 =	0.0005	0.0024	0.0005	0.0024	0.0005	0.0024
Input CH_4 from GLYCalc =	0.0975	0.4273	0.0975	0.4273	0.0975	0.4273
CH_4 as CO_2e =	2.4375	10.6825	2.4375	10.6825	2.4375	10.6825
Total CO_2 + CO_2e =	2.4380	10.6849	2.4380	10.6849	2.4380	10.6849

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condenser Vent Stream Heat Content - Electric Pump

Each Reboiler Capacity = 1.00 mmBtu/hr

From GRI-GLYCalc
Condenser Vent Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.15E+01	0
Carbon Dioxide	44.010	0.00	6.61E+00	0
Nitrogen	28.013	0.00	1.23E-01	0
Methane	16.042	919.00	2.67E+01	245
Ethane	30.069	1,619.00	2.54E+01	411
Propane	44.096	2,315.00	1.08E+01	250
Isobutane	58.122	3,000.00	2.21E+00	66
n-Butane	58.122	3,011.00	5.00E+00	151
Isopentane	72.149	3,699.00	1.13E+00	42
n-Pentane	72.149	3,707.00	1.22E+00	45
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	5.56E-01	26
Cyclohexane	84.161	4,481.50	4.17E-01	19
Other Hexanes (as n-Hexane)	86.175	4,756.00	8.97E-01	43
n-Heptane	100.204	5,502.50	1.39E+00	76
Methylcyclohexane	98.188	5,215.70	6.88E-01	36
Benzene	78.114	3,741.80	1.18E+00	44
Toluene	92.141	4,475.00	2.50E+00	112
Ethylbenzene	106.167	5,222.20	1.59E-01	8
Xylenes	106.500	5,208.87	1.53E+00	80
C8+ (as Nonane)	128.258	6,996.40	1.15E-02	1
		*** Total =**	**1.00E+02**	**1,655**

* May not = 100% due to rounding

GLYCalc Flow Rate = 1.73E+02 SCFH

Condenser Stream Heat Content = 0.29 mmBtu/hr

Condenser + Flash Tank Off-Gas Stream Heat Content = 1.46 mmBtu/hr

Excess (not burned by reboiler) = 0.46 mmBtu/hr

Note: Non-condensables from the condenser vent stream and flash tank overhead vapors will be burned by the reboiler as fuel during typical operating conditions. The heating value of each stream has been calculated to determine how much can be burned by each 1.0-mmBtu/hr reboiler. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum. During upset conditions, excess flash gas may be routed to the flare and combusted. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors. Excess gases that are not burned in the reboiler would be burned in the flare during upset conditions only.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flash Tank Off-Gas Heat Content - Electric Pump

Each Reboiler Capacity = 1.00 mmBtu/hr

From GRI-GLYCalc
Flash Tank Off-Gas Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.08E-01	0
Carbon Dioxide	44.010	0.00	1.57E+00	0
Nitrogen	28.013	0.00	3.38E-01	0
Methane	16.042	919.00	7.27E+01	668
Ethane	30.069	1,619.00	1.91E+01	309
Propane	44.096	2,315.00	4.07E+00	94
Isobutane	58.122	3,000.00	5.49E-01	16
n-Butane	58.122	3,011.00	9.53E-01	29
Isopentane	72.149	3,699.00	1.90E-01	7
n-Pentane	72.149	3,707.00	1.65E-01	6
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	4.30E-02	2
Cyclohexane	84.161	4,481.50	7.89E-03	0
Other Hexanes (as n-Hexane)	86.175	4,756.00	8.97E-02	4
n-Heptane	100.204	5,502.50	5.79E-02	3
Methylcyclohexane	98.188	5,215.70	1.12E-02	1
Benzene	78.114	3,741.80	3.46E-03	0
Toluene	92.141	4,475.00	5.75E-03	0
Ethylbenzene	106.167	5,222.20	3.20E-04	0
Xylene	106.500	5,208.87	2.38E-03	0
C8+ (as Nonane)	128.258	6,996.40	1.74E-03	0
		*** Total =**	**1.00E+02**	**1,141**

*May not = 100% due to rounding

GLYCalc Flow Rate = 1.03E+03 SCFH

Flash Tank Off-Gas Heat Content = 1.18 mmBtu/hr

Condenser + Flash Tank Off-Gas Stream Heat Content = 1.46 mmBtu/hr

Excess (not burned by reboiler) = 0.46 mmBtu/hr

Note: Non-condensables from the condenser vent stream and flash tank overhead vapors will be burned by the reboiler as fuel during typical operating conditions. The heating value of each stream has been calculated to determine how much can be burned by each 1.0-mmBtu/hr reboiler. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum. During upset conditions, excess flash gas may be routed to the flare and combusted. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors. Excess gases that are not burned in the reboiler would be burned in the flare during upset conditions only.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condenser Vent Stream Heat Content - Gas Pumps

Each Reboiler Capacity = 1.00 mmBtu/hr

From GRI-GLYCalc
Condenser Vent Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.15E+01	0
Carbon Dioxide	44.010	0.00	2.25E+00	0
Nitrogen	28.013	0.00	1.50E-01	0
Methane	16.042	919.00	4.32E+01	397
Ethane	30.069	1,619.00	1.97E+01	319
Propane	44.096	2,315.00	8.26E+00	191
Isobutane	58.122	3,000.00	1.62E+00	49
n-Butane	58.122	3,011.00	3.33E+00	100
Isopentane	72.149	3,699.00	8.79E-01	33
n-Pentane	72.149	3,707.00	8.50E-01	32
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	4.04E-01	19
Cyclohexane	84.161	4,481.50	3.38E-01	15
Other Hexanes (as n-Hexane)	86.175	4,756.00	6.67E-01	32
n-Heptane	100.204	5,502.50	1.08E+00	59
Methylcyclohexane	98.188	5,215.70	5.84E-01	30
Benzene	78.114	3,741.80	1.29E+00	48
Toluene	92.141	4,475.00	2.42E+00	108
Ethylbenzene	106.167	5,222.20	1.33E-01	7
Xylenes	106.500	5,208.87	1.28E+00	67
C8+ (as Nonane)	128.258	6,996.40	1.86E-02	1
		* Total =	**1.00E+02**	**1,508**

* May not = 100% due to rounding

GLYCalc Flow Rate = 1.25E+02 SCFH

Condenser Stream Heat Content = 0.19 mmBtu/hr

Condenser + Flash Tank Off-Gas Stream Heat Content = 1.36 mmBtu/hr

Excess (not burned by reboiler) = 0.36 mmBtu/hr

Note: Non-condensables from the condenser vent stream and flash tank overhead vapors will be burned by the reboiler as fuel during typical operating conditions. The heating value of each stream has been calculated to determine how much can be burned by each 1.0-mmBtu/hr reboiler. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum. During upset conditions, excess flash gas may be routed to the flare and combusted. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors. Excess gases that are not burned in the reboiler would be burned in the flare during upset conditions only.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flash Tank Off-Gas Heat Content - Gas Pumps

Each Reboiler Capacity = 1.00 mmBtu/hr

From GRI-GLYCalc
Flash Tank Off-Gas Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.08E-01	0
Carbon Dioxide	44.010	0.00	3.86E-01	0
Nitrogen	28.013	0.00	2.99E-01	0
Methane	16.042	919.00	8.51E+01	782
Ethane	30.069	1,619.00	1.07E+01	173
Propane	44.096	2,315.00	2.25E+00	52
Isobutane	58.122	3,000.00	2.92E-01	9
n-Butane	58.122	3,011.00	4.63E-01	14
Isopentane	72.149	3,699.00	1.10E-01	4
n-Pentane	72.149	3,707.00	8.64E-02	3
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	2.43E-02	1
Cyclohexane	84.161	4,481.50	5.20E-03	0
Other Hexanes (as n-Hexane)	86.175	4,756.00	5.13E-02	2
n-Heptane	100.204	5,502.50	3.84E-02	2
Methylcyclohexane	98.188	5,215.70	8.32E-03	0
Benzene	78.114	3,741.80	3.09E-03	0
Toluene	92.141	4,475.00	5.34E-03	0
Ethylbenzene	106.167	5,222.20	3.07E-04	0
Xylene	106.500	5,208.87	2.31E-03	0
C8+ (as Nonane)	128.258	6,996.40	4.14E-03	0
		* Total =	9.99E+01	1,045

*May not = 100% due to rounding

GLYCalc Flow Rate = 1.09E+04 SCFH

Flash Tank Off-Gas Heat Content = 11.39 mmBtu/hr

Condenser + Flash Tank Off-Gas Stream Heat Content = 11.67 mmBtu/hr

Excess (not burned by reboiler) = 10.67 mmBtu/hr

Note: Non-condensables from the condenser vent stream and flash tank overhead vapors will be burned by the reboiler as fuel during typical operating conditions. The heating value of each stream has been calculated to determine how much can be burned by each 1.0-mmBtu/hr reboiler. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum. During upset conditions, excess flash gas may be routed to the flare and combusted. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors. Excess gases that are not burned in the reboiler would be burned in the flare during upset conditions only.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Heater Emissions Calculations - Criteria Air Pollutants

Equipment Information

Point ID:	EPREBL-1	EPREBL-2	EPREBL-3	EPOH-1
Description:	TEG Reboiler	TEG Reboiler	TEG Reboiler	Hot Oil Heater
Combustor Type:	Uncontrolled	Uncontrolled	Uncontrolled	Uncontrolled
Burner Design (mmBtu/hr):	1.00	1.00	1.00	3.35
Fuel HHV (Btu/scf):	1,138	1,138	1,138	1,138
Annual Fuel Use (mmscf)	7.70	7.70	7.70	25.79
Annual Operating Hours:	8,760	8,760	8,760	8,760

Criteria Air Pollutant Emissions

Point ID:	EPREBL-1		EPREBL-2		EPREBL-3		EPOH-1	
Pollutant	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
NOx	0.09	0.38	0.09	0.38	0.09	0.38	0.29	1.29
CO	0.07	0.32	0.07	0.32	0.07	0.32	0.25	1.08
VOC	<0.01	0.02	<0.01	0.02	<0.01	0.02	0.02	0.07
SO_2	<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	0.02	0.07
PM_{COND}	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.01	0.02
PM_{TOT}	0.01	0.03	0.01	0.03	0.01	0.03	0.02	0.10

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
$PM_{10/2.5}$	5.7
PM_{COND}	1.9
PM_{TOT}	7.6

Source: SO_2: Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel. All Other Pollutants: AP-42 Table 1.4-1, -2 (7/98)

Note: All PM (total, condensable and filterable) is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flash Tank Off-Gas Heat Content - Gas Pumps

Each Reboiler Capacity = 1.00 mmBtu/hr

From GRI-GLYCalc
Flash Tank Off-Gas Stream

Name	MW	LHV	Mole %	Btu/scf
Water	18.015	0.00	1.08E-01	0
Carbon Dioxide	44.010	0.00	3.86E-01	0
Nitrogen	28.013	0.00	2.99E-01	0
Methane	16.042	919.00	8.51E+01	782
Ethane	30.069	1,619.00	1.07E+01	173
Propane	44.096	2,315.00	2.25E+00	52
Isobutane	58.122	3,000.00	2.92E-01	9
n-Butane	58.122	3,011.00	4.63E-01	14
Isopentane	72.149	3,699.00	1.10E-01	4
n-Pentane	72.149	3,707.00	8.64E-02	3
Cyclopentane	70.134	3,764.80	0.00E+00	0
n-Hexane	86.175	4,756.00	2.43E-02	1
Cyclohexane	84.161	4,481.50	5.20E-03	0
Other Hexanes (as n-Hexane)	86.175	4,756.00	5.13E-02	2
n-Heptane	100.204	5,502.50	3.84E-02	2
Methylcyclohexane	98.188	5,215.70	8.32E-03	0
Benzene	78.114	3,741.80	3.09E-03	0
Toluene	92.141	4,475.00	5.34E-03	0
Ethylbenzene	106.167	5,222.20	3.07E-04	0
Xylene	106.500	5,208.87	2.31E-03	0
C8+ (as Nonane)	128.258	6,996.40	4.14E-03	0
		* Total =	9.99E+01	1,045

Non-VOCs
965

*May not = 100% due to rounding

GLYCalc Flow Rate = 1.09E+04 SCFH

Flash Tank Off-Gas Heat Content = 11.39 mmBtu/hr

Condenser + Flash Tank Off-Gas Stream Heat Content = 11.67 mmBtu/hr

Excess (not burned by reboiler) = 10.67 mmBtu/hr

Note: Non-condensables from the condenser vent stream and flash tank overhead vapors will be burned by the reboiler as fuel during typical operating conditions. The heating value of each stream has been calculated to determine how much can be burned by each 1.0-mmBtu/hr reboiler. Any excess vapors not burned as fuel will be routed to the stabilizer feed drum. During upset conditions, excess flash gas may be routed to the flare and combusted. Upset conditions include loss of both permanent and backup power or compressor malfunction of the primary and secondary flash gas compressors. Excess gases that are not burned in the reboiler would be burned in the flare during upset conditions only.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Heater Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Point ID:	EPREBL-1	EPREBL-2	EPREBL-3	EPOH-1
Description:	TEG Reboiler	TEG Reboiler	TEG Reboiler	Hot Oil Heater
Combustor Type:	Uncontrolled	Uncontrolled	Uncontrolled	Uncontrolled
Burner Design (mmBtu/hr):	1.00	1.00	1.00	3.35
Fuel HHV (Btu/scf):	1,138	1,138	1,138	1,138
Annual Fuel Use (mmscf)	7.70	7.70	7.70	25.79
Annual Operating Hours:	8,760	8,760	8,760	8,760

Hazardous Air Pollutant Emissions

Point ID:	EPREBL-1		EPREBL-2		EPREBL-3		EPOH-1	
Pollutant	**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	0.02
Formaldehyde	<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
Toluene	<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**	**0.02**

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.
Miller Compressor Station
Heater Emissions Calculations - Greenhouse Gas Emissions

Equipment Information

Point ID:	EPREBL-1	EPREBL-2	EPREBL-3	EPOH-1
Description:	TEG Reboiler	TEG Reboiler	TEG Reboiler	Hot Oil Heater
Combustor Type:	Uncontrolled	Uncontrolled	Uncontrolled	Uncontrolled
Burner Design (mmBtu/hr):	1.00	1.00	1.00	3.35
Fuel HHV (Btu/scf):	1,138	1,138	1,138	1,138
Annual Fuel Use (mmscf)	7.70	7.70	7.70	25.79
Annual Operating Hours:	8,760	8,760	8,760	8,760

Greenhouse Gas (GHG) Emissions

Point ID:	EPREBL-1		EPREBL-2		EPREBL-3		EPOH-1	
Pollutant	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	391.87	1,557.10
CH_4	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.01	0.03
N_2O	<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	0.18	0.73
N_2O as CO_2e	0.07	0.26	0.07	0.26	0.07	0.26	0.22	0.87
Total CO_2 + CO_2e	117.10	465.28	117.10	465.28	117.10	465.28	392.28	1,558.70

Point ID:	EPREBL-1		EPREBL-2		EPREBL-3		EPOH-1	
Pollutant	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	391.87	1,716.40
CH_4	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.01	0.03
N_2O	<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	0.18	0.81
N_2O as CO_2e	0.07	0.29	0.07	0.29	0.07	0.29	0.22	0.96
Total CO_2 + CO_2e	117.10	512.89	117.10	512.89	117.10	512.89	392.28	1,718.18

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.
Miller Compressor Station
Flare Emissions Calculations - Criteria Air Pollutants

Unit ID	Pollutant	Emission Factors [1]	Emissions	
			lb/hr	tons/yr
APCFLARE	NOx	-	2.89	0.45
(Flare + Pilot + Purge)	CO	-	15.62	2.11
	VOC	-	18.48	2.43
	SO_2	-	0.00005	0.00022
	PM_{TOT}	-	<0.01	0.01
APCFLARE	NOx	0.068	2.87	0.38
(Flare Stream)	CO	0.37	15.60	2.05
	VOC	Mass Balance [2]	18.48	2.43
APCFLARE	NOx	100	0.007	0.028
(Pilot Gas)	CO	84	0.005	0.024
	VOC	5.5	0.0004	0.0016
	SO_2	Mass Balance [3]	0.000019	0.00008
	PM_{TOT}	7.6	0.0005	0.0022
APCFLARE	NOx	100	0.011	0.048
(Purge Gas) [4]	CO	84	0.009	0.040
	VOC	5.5	0.0006	0.0026
	SO_2	Mass Balance [3]	0.000031	0.00014
	PM_{TOT}	7.6	0.0008	0.0037

Flare Stream [5]:	924.12	VOC to flare from all sources (lb/hr)
	1,516	Flare Stream Heat Content (Btu/ft^3)
	42,175,502	Flare Stream Net Btu Value (Btu/hr)
	263	Flare Hours/Yr
	98.00%	Flare Control Efficiency
Pilot:	975	Pilot Gas Heat Content (Btu/ft^3)
	65	Pilot Gas Flow Rate (scfh)
	8,760	Pilot Gas Hours/Yr
Purge Gas:	975	Purge Heat Content (Btu/ft^3)
	110	Purge Gas Flow Rate (scfh)
	8,760	Purge Gas Hours/Yr

1) Flare NOx and CO emission factors (lb/mmBtu): AP-42, Table 13.5-1 (1/95), based on heat input to the flare. Pilot and Purge Gas NOx, CO, VOC, and PM_{TOT} emission factors (lb/mmscf): AP-42 Table 1.4-1, -2 (7/98) SO_2: Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel.

2) VOC emissions estimated based on VOC routed to flare and 98% efficiency.

3) Mass balance assuming fuel sulfur content of 1 grain sulfur per 100 cubic feet of fuel.

4) Purge gas used to prevent air impingement in the process header where there is little or no process flow going to the flare (as in the case of a intermittent or ESD flare).

5) See attached Flare Stream Analysis.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flare Stream Analysis

		Flash Tank Off-Gas from Three (3) Dehys		Flash Drum Vapors		Stabilizer Overheads		Total Streams Burned in Flare			Emissions @ 98% Destruction		Component Net Heating Value	Net Btu Value
		29.1284	MSCF/D	452.4600	MSCF/D	185.5790	MSCF/D	Uncontr.			Contr.			
	Mol Wt	Mol %	lb/hr	Mol %	lb/hr	Mol %	lb/hr	lb/hr	tons/yr	scfd	lb/hr	tons/yr	Btu/scf	Btu/hr
Water	18.0150	0.10800	0.06	0.129107	1.16	0.006222	0.02	1.241	0.163	627	0.02	<0.01	0.00	0
Carbon Dioxide	44.0100	0.40100	0.56	0.313125	6.85	0.261291	2.34	9.756	1.282	2,018	9.76	1.28	0.00	0
Nitrogen	28.0134	0.32300	0.29	0.129107	1.80	0.006222	0.04	2.122	0.279	690	0.04	0.01	0.00	0
Hydrogen Sulfide	34.0760	0.00000	0.00	0.000000	0.00	0.000000	0.00	0.000	0.000	0	0.00	<0.01	637.11	0
Methane	16.0420	79.40000	40.75	61.175900	487.65	9.302310	30.41	558.813	73.428	317,188	11.18	1.47	919.00	12,145,641
Ethane	30.0690	14.00000	13.47	25.447000	380.21	29.276200	179.41	573.093	75.304	173,546	11.46	1.51	1,619.00	11,707,121
Propane	44.0960	3.92000	5.53	9.368400	205.28	47.217900	424.35	635.157	83.460	131,157	12.70	1.67	2,315.00	12,651,147
Isobutane	58.1220	0.51000	0.95	1.072820	30.98	5.107820	60.51	92.436	12.146	14,482	1.85	0.24	3,000.00	1,810,210
n-Butane	58.1220	0.88200	1.64	1.749250	50.52	6.211420	73.58	125.739	16.522	19,699	2.51	0.33	3,011.00	2,471,361
Isopentane	72.1490	0.19300	0.45	0.335124	12.01	1.074850	15.81	28.265	3.714	3,567	0.57	0.07	3,699.00	549,797
n-Pentane	72.1490	0.16000	0.37	0.263979	9.46	0.888283	13.06	22.895	3.008	2,889	0.46	0.06	3,707.00	446,303
n-Hexane	86.1750	0.03440	0.09	0.115048	4.93	0.464316	8.15	13.176	1.731	1,392	0.26	0.03	4,404.00	255,476
Other Hexanes	86.1750	0.06959	0.19	0.000000	0.00	0.000000	0.00	0.192	0.025	20	0.00	<0.01	4,404.00	3,720
Heptanes	100.2020	0.03340	0.11	0.000000	0.00	0.000000	0.00	0.107	0.014	10	0.00	<0.01	5,100.00	2,067
Benzene	78.1140	0.00500	0.01	0.000000	0.00	0.000000	0.00	0.012	0.002	1	0.00	<0.01	3,590.90	218
Toluene	92.1410	0.00414	0.01	0.000000	0.00	0.000000	0.00	0.012	0.002	1	0.00	<0.01	4,273.60	215
Ethylbenzene	106.1670	0.00004	0.00	0.000000	0.00	0.000000	0.00	0.000	0.000	0	0.00	<0.01	4,970.50	3
Xylenes	106.5000	0.00004	0.00	0.000000	0.00	0.000000	0.00	0.000	0.000	0	0.00	<0.01	4,957.10	3
Octanes	114.2290	0.00223	0.01	0.030227	1.72	0.189306	4.41	6.131	0.806	489	0.12	0.02	6,493.00	132,221
	Totals	100.04585	64.49	100.13	1,192.57	100.01	812.09	2,069.15	271.89	667,776		-	Btu/hr	42,175,502
							Total VOC	924.12	121.43	-	18.48	2.43	Heat Value (Btu/scf)	1,516
							Total HAP	13.20	1.73	-	0.26	0.03		
							Total H_2S	0.00	0.00	-	0.00	0.00		
							MW (Stream) =	28.21						

Notes:
Under typical non-emergency operating conditions, excess flash tank off-gas from both dehys (the amount not burned in glycol reboilers), flash gas from condensate feed drum, and stabilizer overheads are recompressed into the suction. However, these streams may be flared up to 263 hrs/yr during upset conditions, such as compressor malfunction, or maintenance activities, such as blowdowns prior to compressor maintenance. The flare pilot will be lit continuously (8,760 hrs/yr).

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flare Design Evaluation - Emergency Conditions (Sonic Velocity)

			Flare Tip Diameter =	**10**	*inches*
			Flare Stream Flow =	**27,824**	*scfh*
Compound	*Mole Percent*	*Mole Fraction*	*Gross Heat Value (Btu/scf)*	*Net Heat Value (Btu/scf)*	*Mixture Net Heat Value (Btu/scf)*
Water		0.00000	0.0	0.0	0.0
Carbon Dioxide	0.0700	0.00070	0.0	0.0	0.0
Nitrogen		0.00000	0.0	0.0	0.0
Hydrogen Sulfide		0.00000	637.1	586.8	0.0
Methane	2.3900	0.02390	1,010.0	919.0	22.0
Ethane	7.5400	0.07540	1,769.7	1,619.0	122.1
Propane	12.2600	0.12260	2,516.2	2,315.0	283.8
Isobutane		0.00000	3,252.0	3,000.0	0.0
n-Butane	13.8300	0.13830	3,262.4	3,011.0	416.4
Isopentane	0.0000	0.00000	4,000.9	3,699.0	0.0
n-Pentane	11.2000	0.11200	4,008.7	3,707.0	415.2
Hexanes (as n-Hexane)	52.7100	0.52710	4,756.0	4,404.0	2,321.3
n-Heptane		0.00000	5,502.5	5,100.0	0.0
Benzene		0.00000	3,741.8	3,590.9	0.0
Toluene		0.00000	4,475.0	4,273.6	0.0
Ethylbenzene		0.00000	5,222.2	4,970.5	0.0
Xylenes		0.00000	5,208.9	4,957.1	0.0
Octanes + (as n-Nonane)		0.00000	6,996.4	6,493.0	0.0
TOTALS:	100.0000				3,580.8

Notes:
1) Composition above represents design (worst-case) emergency scenario. Actual anticipated flare stream composition shown in the Flare Stream Analysis table.
2) Flare is a sonic (pressure-assisted) flare that is not subject to maximum allowable flare exit velocity limits during emergency use. Pressure-assisted flares utilize the waste gas pressure to create a condition where air is drawn into contact with the gas and mixed to achieve smokeless combustion. This results in high exit velocities greater than 400 ft/sec; however, sonic flares are designed to have comparable or higher combustion efficiencies than air-assisted or steam-assisted flares.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flare Design Evaluation - Non-Emergency Conditions (Subsonic Velocity)

Flare Tip Diameter =	**10**	*inches*
Flare Stream Flow =	**27,824**	*scfh*
Assist gas requirements for nonassisted flare per 40 CFR 60.18(c)(3):		
Min. allowable net heat value for nonassisted flare	200	*Btu/scf*
Additional assist gas required	0	*scfh*
Assist (fuel) gas supplied	0	*scfh*
Assist air	0	*scfh*
Maximum allowable flare exit velocity (V_{max}) for non-assisted flare per 40 CFR 60.18(f)(5):		
	Btu/scf	MJ/scm
Lower (Net) Heating Value (Btu/scf)	1,515.8	56.5
	m/sec	ft/sec
Log_{10} (V_{max}) = (LHV +28.8)/31.7	492.1	1,614.2
V_{max} limit based on 40 CFR 60.18(b)(4)(iii)	122.0	400.0
Actual Tip Velocity	5.9	19.3
Less than maximum allowable flare exit velocity?	YES	YES
Actual flare exit velocity:		
Total volumetric flow ((Flare stream + Assist gas + Assist air in scfh)/3600 sec/hr)	7.73	*scf/sec*
Total volumetric flow	10.55	*acf/sec*
Flare exit cross-sectional area based on diameter	0.55	*ft^2*
Velocity = volumetric flow / cross-sectional area	19.3	*ft/sec*

Notes:
1) LHV based on stream composition during non-emergency conditions, which includes up to 263 hours per year of flaring excess flash tank off-gas from both dehys (the amount not burned in glycol reboilers), flash gas from condensate feed drum, and stabilizer overheads that are typically recompressed into the suction under normal operating conditions.

2) During non-emergency conditions, flow rates with pressures 3 - 11 psig will exit at subsonic velocities.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Flare Emissions Calculations - Greenhouse Gas Emissions

Unit ID	Pollutant	Emission Factors	Emissions lb/hr	Emissions tonnes/yr	Emissions tons/yr
APCFLARE	CO_2	-	29.72	80.59	88.83
(Flare + Pilot + Purge)	CH_4	-	11.18	1.47	1.62
	N_2O	-	<0.01	<0.01	<0.01
	CH_4 as CO_2e	-	279.42	36.75	40.51
	N_2O as CO_2e	-	0.01	0.04	0.05
	Total CO_2 + CO_2e	-	**309.14**	**117.39**	**129.39**
APCFLARE	CO_2	Mass Balance	9.76	1.28	1.41
(Flare Stream)	CH_4	Mass Balance	11.18	1.47	1.62
	N_2O	-	-	-	-
	CH_4 as CO_2e	-	279.41	36.71	40.47
	N_2O as CO_2e	-	-	-	-
	Total CO_2 + CO_2e	-	**300.34**	**39.46**	**43.50**
APCFLARE	CO_2	53.06	7.41	29.46	32.47
(Pilot Gas)	CH_4	0.001	<0.01	<0.01	<0.01
	N_2O	0.0001	<0.01	<0.01	<0.01
	CH_4 as CO_2e	-	<0.01	0.01	0.02
	N_2O as CO_2e	-	<0.01	0.02	0.02
	Total CO_2 + CO_2e	-	**7.42**	**29.49**	**32.50**
APCFLARE	CO_2	53.06	12.55	49.85	54.95
(Purge Gas)	CH_4	0.001	<0.01	<0.01	<0.01
	N_2O	0.0001	<0.01	<0.01	<0.01
	CH_4 as CO_2e	-	0.01	0.02	0.03
	N_2O as CO_2e	-	0.01	0.03	0.03
	Total CO_2 + CO_2e	-	**12.56**	**49.90**	**55.01**

	263	Flare Hours/Yr
Pilot:	975	Pilot Gas Heat Content (Btu/ft^3)
	65	Pilot Gas Flow Rate (scfh)
	0.06	Pilot Gas Capacity (mmBtu/hr)
	8,760	Pilot Gas Hours/Yr
Purge Gas:	975	Purge Gas Stream Heat Content (Btu/ft^3)
	110	Purge Gas Flow Rate (scfh)
	0.11	Purge Gas Capacity (mmBtu/hr)
	8,760	Purge Gas Hours/Yr

Source: Flare Stream: Mass balance. Pilot Gas and Purge Gas: 40 CFR 98
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.
Miller Compressor Station
Condensate Storage Emissions - Criteria Air Pollutants

Tank Information

Point ID:	EPTK1 - EPTK-12
Each Tank[1] :	
Capacity (bbl):	400
Capacity (gal):	16,800
Throughput (bbl/yr):	27,375
Throughput (gal/yr):	1,149,750
Throughput (bbl/d):	75
Control Type[2] :	VRU
Control Efficiency:	98%
Total Throughput (gal/yr):	13,797,000

Uncontrolled VOC Emissions

Point ID:	Each Tank		EPTK-1 - EPTK-12 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	6,752.97	3.38	81,035.64	40.52
Breathing	1,444.25	0.72	17,331.00	8.67
Flashing	52,177.74	26.09	626,132.88	313.07
Total =	**60,374.96**	**30.19**	**724,499.52**	**362.25**

Controlled VOC Emissions

Point ID:	Each Tank		EPTK-1 - EPTK-12 (Total)	
Emissions	**lb/yr**	**tons/yr**	**lb/yr**	**tons/yr**
Working	135.06	0.07	1,620.71	0.81
Breathing	28.89	0.01	346.62	0.17
Flashing	1,043.55	0.52	12,522.66	6.26
Total =	**1,207.50**	**0.60**	**14,489.99**	**7.24**

1) There are twelve (12) like-kind storage tanks. Ten are used to store stabilized condensate and two are used to store pipeline fluids/water. Each tank was modeled with an estimated 1,149,750 gal/yr throughput with a maximum of 13,797,000 gal/yr throughput for all 12 tanks. All tanks were modeled as Gasoline RVP15 in EPA TANKS 4.0.9d for a conservative emissions estimate of working and breathing. Flash emissions were modeled with ProMax process simulation.

2) Tanks are controlled by vapor recovery system, which is a closed system that is 100% efficient at preventing VOC 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 2% of the 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.
Miller Compressor Station
Flashing Emissions - Process Simulation

ProMax Results

	lb/hr	VOC TPY
Hydrogen Sulfide	-	-
Nitrogen	0.00076814	-
Carbon Dioxide	0.020884	-
Methane	0.38767	
Ethane	2.3165	-
Propane	10.783	47.2295
i-Butane	9.3957	41.1532
n-Butane	27.685	121.2603
i-Pentane	7.438316	32.5798
n-Pentane	7.6757	33.6196
n-Hexane	2.4347	10.6640
Other Hexanes	4.43775	19.4373
Benzene	0.038517	0.1687
Heptane	1.45284	6.3634
Toluene	0.023862	0.1045
Octane	0.10369	0.4542
Ethylbenzene	0.0000	0.0000
Xylenes	0.0031977	0.0140
Nonanes	0.0039218	0.0172
Decanes	0.00016119	0.0007
Total =	**71.4691**	**313.0664**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Handling Emissions - Hazardous Air Pollutants

Uncontrolled HAP Emissions (tons/yr)

Point ID:	Each Tank	EPTK-1 - EPTK-12 (Total)
Total VOC* =	**30.19**	**362.25**
n-Hexane	1.03	12.34
Benzene	0.02	0.20
Toluene	0.01	0.12
Ethylbenzene	<0.01	<0.01
Xylenes	<0.01	0.02
Total HAPs =	**1.06**	**12.67**

Controlled HAP Emissions (tons/yr)

Point ID:	Each Tank	EPTK-1 - EPTK-12 (Total)
Total VOC* =	**0.60**	**7.24**
n-Hexane	0.02	0.25
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylenes	<0.01	<0.01
Total HAPs =	**0.02**	**0.25**

*VOC emissions calculated in Criteria Air Pollutant calculations

Estimated HAP Composition (% by Weight) **

Pollutant	Wt%
n-Hexane	3.406%
Benzene	0.054%
Toluene	0.033%
Ethylbenzene	0.000%
Xylenes	0.004%
Total HAPs =	**4.398%**

** ProMax flash gas composition

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Loading Emissions

Loading Information

Point ID:	**EPLOAD**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
Em. Factor (lb/1000 gal)*:	3.29
Throughput (1000 gal):	13,797
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:

7.2078	= P, True vapor pressure of liquid loaded (average psia)
31.7964	= M, Molecular weight of vapor (lb/lb-mol) - Actual Analysis
60	= T, Temperature of bulk liquid loaded (average °F)
520	= T, Temperature of bulk liquid loaded (°F + 460 = °R)

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Loading Emissions (Continued)

Uncontrolled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	49.82	22.73

Uncaptured Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	14.95	6.82

Controlled Loading VOC Emissions

Pollutant	lb/hr	tons/yr
VOC	1.74	0.80

Total Loading VOC Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	16.69	7.61

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.
Miller Compressor Station
Condensate Loading Emissions (Continued)

Uncontrolled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**49.82**	**22.73**
n-Hexane	0.80	0.36
Benzene	0.45	0.20
Toluene	0.65	0.30
Ethylbenzene	0.05	0.02
Xylenes	0.25	0.11
Total HAPs	**2.19**	**1.00**

Uncaptured Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**14.95**	**6.82**
n-Hexane	0.24	0.11
Benzene	0.13	0.06
Toluene	0.19	0.09
Ethylbenzene	0.01	0.01
Xylenes	0.07	0.03
Total HAPs	**0.66**	**0.30**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Loading Emissions (Continued)

Controlled Loading HAP Emissions

Pollutant	lb/hr	tons/yr
VOC	**1.74**	**0.80**
n-Hexane	0.03	0.01
Benzene	0.02	0.01
Toluene	0.02	0.01
Ethylbenzene	<0.01	<0.01
Xylenes	0.01	<0.01
Total HAPs	**0.08**	**0.04**

Total Loading HAP Emissions (Uncaptured + Controlled)

Pollutant	lb/hr	tons/yr
VOC	**16.69**	**7.61**
n-Hexane	0.27	0.12
Benzene	0.15	0.07
Toluene	0.22	0.10
Ethylbenzene	0.02	0.01
Xylenes	0.08	0.04
Total HAPs	**0.73**	**0.34**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Loading Emissions (Continued)

HAP Composition (% by Weight) [1]

Pollutant	Wt%
n-Hexane	1.6000%
Benzene	0.9000%
Toluene	1.3000%
Ethylbenzene	0.1000%
Xylenes	0.5000%
Total HAPs	**4.4000%**

Notes:
1) Table 11.3-2, "HAP Percent of VOC Emissions, "Gasoline Marketing (Stage I and Stage II), EPA Document Revised Final 1/2001.

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Loading Emissions Calculations - Greenhouse Gas Emissions

Loading Information

Point ID:	**EPLOAD**
Fill Method:	Submerged
Type of Service:	Dedicated
Mode of Operation:	Normal
Saturation Factor:	0.6
TOC Em. Factor (tonne/10^6 gal) *:	2.20
Throughput (10^6 gal):	13.797
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 =	5.113%
Input CO_2 wt% from vapor analysis =	0.114%

Uncontrolled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	3.75	1.55
CH_4 as CO_2e	93.74	38.80
CO_2	0.08	0.03
Total CO_2 + CO_2e	**93.82**	**38.83**

Uncontrolled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	3.75	1.71
CH_4 as CO_2e	93.74	42.77
CO_2	0.08	0.04
Total CO_2 + CO_2e	**93.82**	**42.81**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Condensate Truck Loading Emissions Calculations - Greenhouse Gas Emissions (Continued)

Uncaptured GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	1.12	0.47
CH_4 as CO_2e	28.12	11.64
CO_2	0.03	0.01
Total CO_2 + CO_2e	**28.15**	**11.65**

Uncaptured GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	1.12	0.51
CH_4 as CO_2e	28.12	12.83
CO_2	0.03	0.01
Total CO_2 + CO_2e	**28.15**	**12.84**

Controlled GHG Emissions - Metric Tons (Tonnes)

Pollutant	lb/hr	tonnes/yr
CH_4	0.13	0.05
CH_4 as CO_2e	3.28	1.36
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**3.28**	**1.36**

Controlled GHG Emissions - Short Tons (Tons)

Pollutant	lb/hr	tons/yr
CH_4	0.13	0.06
CH_4 as CO_2e	3.28	1.50
CO_2	<0.01	<0.01
Total CO_2 + CO_2e	**3.28**	**1.50**

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
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	1.26	0.52
CH_4 as CO_2e	31.40	13.00
CO_2	0.03	0.01
Total CO_2 + CO_2e	**31.43**	**13.01**

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

Pollutant	lb/hr	tons/yr
CH_4	1.26	0.57
CH_4 as CO_2e	31.40	14.33
CO_2	0.03	0.01
Total CO_2 + CO_2e	**31.43**	**14.34**

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.
Miller Compressor Station
Fugitive Emissions Calculations

Equipment Information

Equipment Basis	Function	Default CH_4 Basis (mol %) [1]	CH_4 Adjustment Factor [2]	CH_4 Emission Factor (EF) [3]	Adjusted CH_4 EF	Units
Large Compressor Station	Processing	78.80%	1.104	6.59E-03	7.27E-03	tonne/station-hr
Small Recip. Compressor	Processing	78.80%	1.104	2.12E-04	2.34E-04	tonne/compressor-hr
Dehydrators	Processing	78.80%	1.104	7.13E-05	7.87E-05	tonne/dehydrator-hr
Gas Pump w/ Flash Sep.	N/A	78.80%	1.104	1.54E-04	1.70E-04	tonne/MMSCF processed
Gas Heaters	N/A	78.80%	1.104	4.59E-05	5.07E-05	tonne/heater-hr

Fugitive Emissions

Emission Unit ID	Annual Op Hours	Methane (CH_4)				CO_2
		lb/hr	lb/yr	tonnes/yr	MMSCF/yr	tonnes/yr
Facility-Level	8,760	16.03	140,448	63.71	2.89	0.27
EPCE-2 - EPCE-12	8,760	5.67	49,700	22.54	1.02	0.09
EPGEN-1 - EPGEN-2	8,760	1.03	9,036	4.10	0.19	0.02
EPSTL-1 - EPSTL-3 (Dehys)	8,760	0.52	4,559	2.07	0.09	0.01
EPSTL-1 - EPSTL-3 (Pumps)	8,760	1.12	9,846	4.47	0.20	0.02
EPRBL-1 - EPRBL-3	8,760	0.34	2,935	1.33	0.06	0.01
EPOH-1	8,760	0.11	978	0.44	0.02	<0.01
	TOTAL =	**24.83**	**217,503.10**	**98.66**	**4.47**	**0.41**

Emission Unit ID	Annual Op Hours	VOC	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes
		tonnes/yr					
Facility-Level	8,760	5.02	0.05	<0.01	<0.01	<0.01	<0.01
EPCE-2 - EPCE-12	8,760	1.77	0.02	<0.01	<0.01	<0.01	<0.01
EPGEN-1 - EPGEN-2	8,760	0.32	<0.01	<0.01	<0.01	<0.01	<0.01
EPSTL-1 - EPSTL-3 (Dehys)	8,760	0.16	<0.01	<0.01	<0.01	<0.01	<0.01
EPSTL-1 - EPSTL-3 (Pumps)	8,760	0.35	<0.01	<0.01	<0.01	<0.01	<0.01
EPRBL-1 - EPRBL-3	8,760	0.10	<0.01	<0.01	<0.01	<0.01	<0.01
EPOH-1	8,760	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
	TOTAL =	**7.77**	**0.08**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

Continued on Next Page

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Fugitive Emissions Calculations (Continued)

Emission Unit ID	Annual Op Hours	Methane (CH_4)				CO_2
		lb/hr	lb/yr	tons/yr	MMSCF/yr	tons/yr
Facility-Level	8,760	16.03	140,448	70.22	2.89	0.29
EPCE-2 - EPCE-12	8,760	5.67	49,700	24.85	1.02	0.10
EPGEN-1 - EPGEN-2	8,760	1.03	9,036	4.52	0.19	0.02
EPSTL-1 - EPSTL-3 (Dehys)	8,760	0.52	4,559	2.28	0.09	0.01
EPSTL-1 - EPSTL-3 (Pumps)	8,760	1.12	9,846	4.92	0.20	0.02
EPRBL-1 - EPRBL-3	8,760	0.34	2,935	1.47	0.06	0.01
EPOH-1	8,760	0.11	978	0.44	0.02	<0.01
	TOTAL =	**24.83**	**217,503.10**	**108.71**	**4.47**	**0.46**

Emission Unit ID	Annual Op Hours	VOC	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes
		tons/yr					
Facility-Level	8,760	5.53	0.06	<0.01	<0.01	<0.01	<0.01
EPCE-2 - EPCE-12	8,760	1.96	0.02	<0.01	<0.01	<0.01	<0.01
EPGEN-1 - EPGEN-2	8,760	0.36	<0.01	<0.01	<0.01	<0.01	<0.01
EPSTL-1 - EPSTL-3 (Dehys)	8,760	0.18	<0.01	<0.01	<0.01	<0.01	<0.01
EPSTL-1 - EPSTL-3 (Pumps)	8,760	0.39	<0.01	<0.01	<0.01	<0.01	<0.01
EPRBL-1 - EPRBL-3	8,760	0.12	<0.01	<0.01	<0.01	<0.01	<0.01
EPOH-1	8,760	0.04	<0.01	<0.01	<0.01	<0.01	<0.01
	TOTAL =	**8.56**	**0.09**	**<0.01**	**0.01**	**<0.01**	**<0.01**

Emissions Factors [3]

Source Type	Emission Factor	Units
Small Recip. Compressor	2.12E-04	tonne/compressor-hr
Large Compressor Station	6.59E-03	tonne/station-hr
Gas Heaters	4.60E-05	tonne/heater-hr
Dehydrators	7.13E-05	tonne/dehydrator-hr
Gas Pump w/ Flash Sep.	1.54E-04	tonne/MMSCF processed

1) Table 5-2, American Petroleum Institute (API) Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry (August 2009)

2) Emission factor adjusted from default CH_4 basis to actual CH4 basis.

3) Table 5-3 (Pumps) and Table 6-4 (Production Equipment), API Compendium (August 2009)

Note: Large compressors are those with more than 3 stages of compression. Large compressor stations are those with 5 or more compressors. Dehys are equipped with both a gas injection and an electric pump. Emissions have been modeled assuming the gas pump for a more conservative (higher) emissions estimate.

Continued on Next Page

Gas Analysis *

Component	Molecular Weight	Mole %	Density (g/l)	Contrib. to Overall Density (g/l)	Weight %
Hydrogen Sulfide	34.082	0.000%	1.438	0.0000	0.00%
Carbon Dioxide	44.010	0.176%	1.857	0.0033	0.42%
Nitrogen	28.013	0.296%	1.182	0.0035	0.45%
Helium	4.003	0.000%	0.169	0.0000	0.00%
Oxygen	31.999	0.000%	1.350	0.0000	0.00%
Methane	16.042	86.960%	0.677	0.5886	75.48%
Ethane	30.069	9.696%	1.269	0.1230	15.78%
Propane	44.096	1.989%	1.860	0.0370	4.75%
i-Butane	58.122	0.248%	2.452	0.0061	0.78%
n-Butane	58.122	0.368%	2.452	0.0090	1.16%
i-Pentane	72.149	0.094%	3.044	0.0029	0.37%
n-Pentane	72.149	0.068%	3.044	0.0021	0.27%
n-Hexane	86.175	0.018%	3.636	0.0007	0.08%
Other Hexanes	86.175	0.040%	3.636	0.0015	0.19%
Heptanes (as n-Heptane)	100.202	0.027%	4.228	0.0011	0.14%
Benzene	78.114	0.001%	3.296	0.0000	0.00%
Toluene	92.141	0.001%	3.888	0.0000	0.00%
Ethylbenzene	106.167	0.000%	4.479	0.0000	0.00%
Xylenes	106.167	0.001%	4.479	0.0000	0.00%
Octanes (as n-Octane)	114.229	0.014%	4.819	0.0007	0.09%
Nonanes (as n-Nonane)	128.255	0.004%	5.411	0.0002	0.03%
Decanes (as n-Decane)	142.282	0.001%	6.003	0.0001	0.01%
	TOTALS =	100.002%	64.669	0.7797	100.00%
				TOTAL VOC =	7.87%
				TOTAL HAP =	0.10%
		GAS DENSITY =	48,676.87	lb/mmscf	

Gas analysis dated 9/3/2014

Appalachia Midstream Services, L.L.C.
Miller Compressor Station
Blowdown Emissions Calculations

Estimated volume (scf/yr) =	4,290,000
Maximum volume/blowdown (scf/hr) =	6,500
Number of Compressors =	11
Number of Blowdowns per Year =	60

Speciated Gas Analysis and Emission Rates

Component	Molecular Weight	Vent Stream							lb/hr for 1 Blowdown over 1 hr[2]		
	lb/lb-mole	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	scf/yr	lb-mole/yr	TPY	scf/hr	lb-mole/hr[3]	lb/hr
Hydrogen Sulfide	34.082	0.000%	0.000	0.000%	-	0	0	0.00	0	0	0.00
Carbon Dioxide	44.010	0.176%	0.077	0.419%	-	7,550	20	0.44	11	0	1.33
Nitrogen	28.013	0.296%	0.083	0.449%	-	12,698	33	0.47	19	0	1.42
Helium	4.003	0.000%	0.000	0.000%	-	0	0	0.00	0	0	0.00
Oxygen	31.999	0.000%	0.000	0.000%	-	0	0	0.00	0	0	0.00
Methane	16.042	86.960%	13.950	75.483%	76.144%	3,730,584	9,833	78.87	5,652	15	239.01
Ethane	30.069	9.696%	2.915	15.776%	15.914%	415,958	1,096	16.48	630	2	49.95
Propane	44.096	1.989%	0.877	4.746%	4.787%	85,328	225	4.96	129	0	15.03
i-Butane	58.122	0.248%	0.144	0.780%	0.787%	10,639	28	0.81	16	0	2.47
n-Butane	58.122	0.368%	0.214	1.157%	1.167%	15,787	42	1.21	24	0	3.66
i-Pentane	72.149	0.094%	0.068	0.367%	0.370%	4,033	11	0.38	6	0	1.16
n-Pentane	72.149	0.068%	0.049	0.265%	0.268%	2,917	8	0.28	4	0	0.84
n-Hexane	86.175	0.018%	0.015	0.083%	0.084%	768	2	0.09	1	0	0.26
Other Hexanes	86.175	0.040%	0.035	0.188%	0.190%	1,733	5	0.20	3	0	0.60
Heptanes (as n-Heptane)	100.202	0.027%	0.027	0.145%	0.146%	1,145	3	0.15	2	0	0.46
Benzene	78.114	0.001%	0.000	0.002%	0.002%	21	0	<0.01	0	0	0.01
Toluene	92.141	0.001%	0.001	0.005%	0.005%	43	0	0.01	0	0	0.02
Ethylbenzene	106.167	0.000%	0.000	0.001%	0.001%	4	0	<0.01	0	0	<0.01
Xylenes	106.167	0.001%	0.001	0.005%	0.005%	34	0	<0.01	0	0	0.01
Octanes (as n-Octane)	114.229	0.014%	0.016	0.089%	0.090%	618	2	0.09	1	0	0.28
2,2,4-Trimethylpentane	114.230	0.000%	0.000	0.000%	0.000%	0	0	0.00	0	0	0.00
Nonanes (as n-Nonane)	128.255	0.004%	0.006	0.030%	0.030%	184	0	0.03	0	0	0.09
Decanes (as n-Decane)	142.282	0.001%	0.002	0.010%	0.010%	56	0	0.01	0	0	0.03
	TOTAL =	100.002%	**18.481**	100.000%	100.000%	4,290,103	11,308	104.49	6,500	17	316.64
		TOTAL HC	**18.321**	**99.132%**	100.000%	4,269,854	11,255	103.58	6,469	17	313.89
				TOTAL VOC =	**7.942%**	**123,312**	**325**	**8.23**	**187**	**0**	**24.93**
				TOTAL HAPs =	**0.097%**	**871**	**2**	**0.10**	**1**	**0**	**0.30**

Notes:
1) Based on an estimated 60 blowdowns per compressor per year with 6,500 scf per blowdown.
2) Due to variable short-term emission rates, average lb/hr based on annual emissions for reference only. Hourly emissions estimated using emissions from 1 blowdown over course of 1 hour.
3) Molar volume conversion @ 60° F and 1 atm: 1 lb/mole = 379.4 scf

ATTACHMENT O: MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

Except as noted on Emissions Unit Data Sheets, AMS is not submitting any 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 for the Miller Compressor Station located in Marshall County, West Virginia. From Bannen, head southwest on Amos Hollow Road/County Road 89 toward Clark Hill for 1.1 miles. Turn left at Laurel Run. In 0.8 miles, turn right to stay on Laurel Run. In 0.4 miles, take slight left at Johnson Hill. Take the first left onto County Road 1/22/Johnson Ridge.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx)	77.46 tons/yr
Carbon Monoxide (CO)	88.63 tons/yr
Volatile Organic Compounds (VOC)	74.54 tons/yr
Particulate Matter (PM)	8.83 tons/yr
Sulfur Dioxide (SO_2)	1.68 tons/yr
Acetaldehyde	0.92 tons/yr
Acrolein	0.67 tons/yr
Benzene	0.59 tons/yr
Ethylbenzene	0.07 tons/yr
Formaldehyde	9.96 tons/yr
Methanol	0.53 tons/yr
n-Hexane	0.85 tons/yr
Toluene	0.96 tons/yr
Xylenes	0.62 tons/yr
Methane	194.32 tons/yr
Carbon Dioxide	77,278.34 tons/yr
Nitrous Oxide	0.14 tons/yr
CO_2 Equivalent	82,169.39 tons/yr

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 XXth of March 2015

By: Appalachia Midstream Services, L.L.C.
Randy DeLaune
General Manager
P.O. Box 54382
Oklahoma City, OK 73154-1382

ATTACHMENT R: AUTHORITY OF CORPORATION

Note: The Authority Form designating Mr. Randy DeLaune, General Manager, signatory authority by Mr. John Michael Stice, President and Chief Operating Officer of Access Midstream Services, has already been submitted to the agency.

APPENDIX A: SUPPORT DOCUMENTS

Manufacture Specification Sheet

Catalyst Specification Sheet

GRI-GLYCalc ™ Input and Aggregate Report (Electric Pump)

GRI-GLYCalc ™ Input and Aggregate Report (Gas Pumps)

Representative Inlet Gas Analysis

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Miller CF 1/13/15

CATERPILLAR®

ENGINE SPEED (rpm):	1400
COMPRESSION RATIO:	8:1
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	201
JACKET WATER OUTLET (°F):	210
ASPIRATION:	TA
COOLING SYSTEM:	JW+OC+1AC, 2AC
CONTROL SYSTEM:	ADEM3
EXHAUST MANIFOLD:	DRY
COMBUSTION:	LOW EMISSION
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5
SET POINT TIMING:	30

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:	Miller CF
FUEL PRESSURE RANGE(psig):	7.0-40.0
FUEL METHANE NUMBER:	68.7
FUEL LHV (Btu/scf):	1026
ALTITUDE(ft):	500
MAXIMUM INLET AIR TEMPERATURE(°F):	77
STANDARD RATED POWER:	1380 bhp@1400rpm

				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	7437	7437	7966	8556
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	8226	8226	8810	9463
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	3144	3144	2467	1724
AIR FLOW	(WET)	(3)(4)	lb/hr	13943	13943	10937	7646
FUEL FLOW (60°F, 14.7 psia)			scfm	167	167	134	96
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	94.0	94.0	76.3	53.6
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	995	995	989	1009
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	9156	9156	7161	5081
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	14428	14428	11327	7925
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	2.71	2.71	2.91	2.85
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	4.79	4.79	5.13	5.21
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	1.21	1.21	1.29	1.31
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.48	0.48	0.51	0.52
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.43	0.43	0.42	0.42
CO2		(8)(9)	g/bhp-hr	484	484	517	562
EXHAUST OXYGEN		(8)(11)	% DRY	9.1	9.1	8.8	8.3
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	23016	23016	21256	19733
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	9927	9927	8186	2728
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	5359	5359	5060	3333

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	41110
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5627
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.

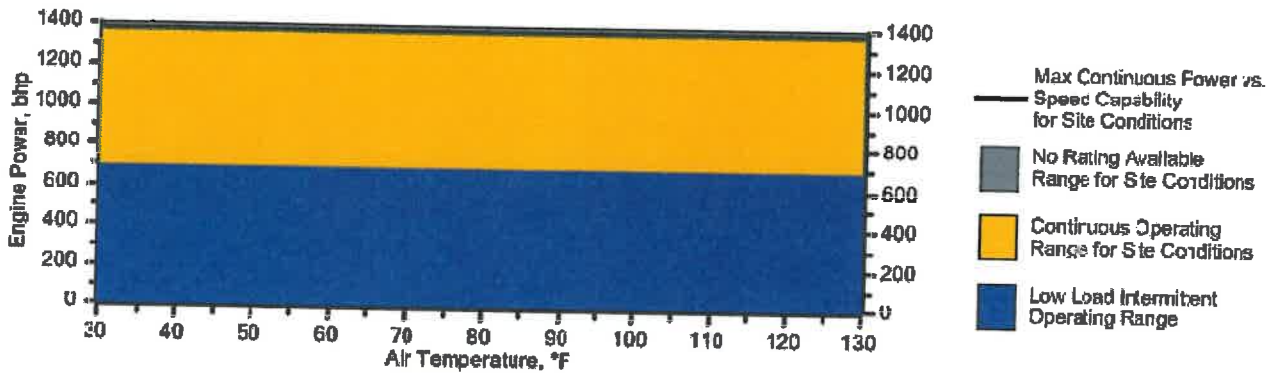
PREPARED BY: Chris Marley, Access Midstream
Data generated by Gas Engine Rating Pro Version 5.01.00
Ref. Data Set DM8800-07-001, Printed 13Jan2015

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Miller CF 1/13/15

CATERPILLAR®

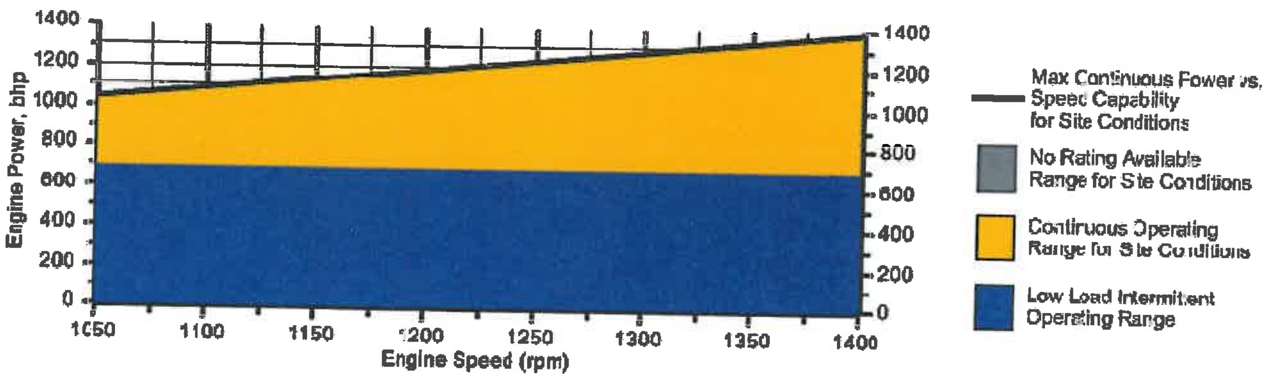
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1400 rpm



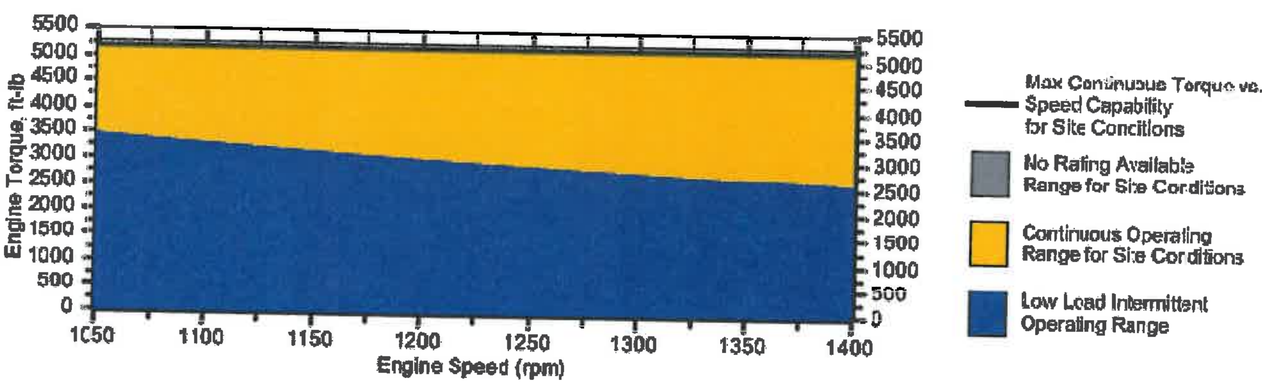
Engine Power vs. Engine Speed

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.

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Miller CF 1/13/15

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	86.9600	86.9600
Ethane	C2H6	9.6960	9.6960
Propane	C3H8	1.9890	1.9890
Isobutane	iso-C4H1O	0.2480	0.2480
Norbutane	nor-C4H1O	0.3680	0.3680
Isopentane	iso-C5H12	0.0940	0.0940
Norpentane	nor-C5H12	0.0680	0.0680
Hexane	C6H14	0.1050	0.1050
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2960	0.2960
Carbon Dioxide	CO2	0.1760	0.1760
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:	Miller CF
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	68.7
Lower Heating Value (Btu/scf):	1026
Higher Heating Value (Btu/scf):	1135
WOBBE Index (Btu/scf):	1285
THC: Free Inert Ratio:	210.86
Total % Inerts (% N2, CO2, He):	0.47%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.997
Stoich A/F Ratio (Vol/Vol):	10.68
Stoich A/F Ratio (Mass/Mass):	16.74
Specific Gravity (Relative to Air):	0.638
Specific Heat Constant (K):	1.297

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.

PREPARED BY: Chris Marley, Access Midstream
Data generated by Gas Engine Rating Pro Version 5.01.00
Ref. Data Set DM8800-07-001, Printed 13Jan2015

10497 Town & Country Way, Ste. 94(
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ohartz@emittechnologies.com

Prepared For:
Kijun Hong
WILLIAMS FIELD SERVICES

QUOTE: QUO-14653-L9T6

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3516B
Horsepower:	1380
RPM:	1400
Compression Ratio:	8.0
Exhaust Flow Rate:	9156 CFM
Exhaust Temperature:	995 °F
Reference:	DM8800-07
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

	g/bhp-hr	Lb/Hr	Tons/Year
NOx:	0.50	1.52	6.66
CO:	2.71	8.24	36.11
THC:	4.79	14.57	63.83
NMHC	1.21	3.68	16.12
NMNEHC:	0.48	1.46	6.40
HCHO:	0.43	1.31	5.73
O2:	9.10 %		

POST CATALYST EMISSIONS

	g/bhp-hr
NOx:	Unaffected by Oxidation Catalyst
CO:	<0.50
VOC:	<0.26

CONTROL EQUIPMENT

Catalyst Housing

Model:	ELH-4200-1616F-4CEE-242
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:	16" Flat Face Flange
Outlet Connections:	16" Flat Face Flange
Configuration:	End In / End 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:	2
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 imprope 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: Miller Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2014Dec R13 Mod change engines\Miller_GLYCalc_Electric.ddf
Date: December 15, 2014

DESCRIPTION:

Description: Three identical dehydration units
Gas analysis 9/3/2014
53.8 MMSCFD/15 gpm
Flash tank recycled to stabilizer feed drum,
still vent condenser/combustion controls

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 50.00 deg. F
Pressure: 1440.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1760
Nitrogen	0.2960
Methane	86.9600
Ethane	9.6960
Propane	1.9890
Isobutane	0.2480
n-Butane	0.3680
Isopentane	0.0940
n-Pentane	0.0680
n-Hexane	0.0179
Cyclohexane	0.0021
Other Hexanes	0.0404
Heptanes	0.0267
Methylcyclohexane	0.0042
2,2,4-Trimethylpentane	0.0004
Benzene	0.0005
Toluene	0.0010
Ethylbenzene	0.0001
Xylenes	0.0008
C8+ Heavies	0.0200

DRY GAS:

Flow Rate: 53.8 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 15.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Recycle/recompression
Temperature: 130.0 deg. F
Pressure: 70.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 120.0 deg. F
Pressure: 14.8 psia

Control Device: Combustion Device
Destruction Efficiency: 95.0 %
Excess Oxygen: 0.0 %
Ambient Air Temperature: 60.0 deg. F

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Miller Compressor Station - Electric Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2014Dec R13 Mod change engines\Miller_GLYCalc_Electric.ddf
Date: December 15, 2014

DESCRIPTION:

Description: Three identical dehydration units
Gas analysis 9/3/2014
53.8 MMSCFD/15 gpm
Flash tank recycled to stabilizer feed drum,
still vent condenser/combustion controls

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0975	2.341	0.4273
Ethane	0.1743	4.183	0.7634
Propane	0.1087	2.609	0.4762
Isobutane	0.0293	0.703	0.1283
n-Butane	0.0663	1.591	0.2904
Isopentane	0.0186	0.445	0.0813
n-Pentane	0.0200	0.480	0.0877
n-Hexane	0.0109	0.262	0.0479
Cyclohexane	0.0080	0.192	0.0351
Other Hexanes	0.0176	0.423	0.0773
Heptanes	0.0318	0.764	0.1395
Methylcyclohexane	0.0154	0.370	0.0675
2,2,4-Trimethylpentane	0.0002	0.004	0.0007
Benzene	0.0210	0.504	0.0920
Toluene	0.0525	1.259	0.2297
Ethylbenzene	0.0038	0.092	0.0168
Xylenes	0.0371	0.891	0.1626
C8+ Heavies	0.0002	0.005	0.0009
Total Emissions	0.7134	17.120	3.1245
Total Hydrocarbon Emissions	0.7134	17.120	3.1245
Total VOC Emissions	0.4415	10.597	1.9339
Total HAP Emissions	0.1255	3.012	0.5497
Total BTEX Emissions	0.1144	2.746	0.5011

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.9513	46.831	8.5467
Ethane	3.4882	83.717	15.2784
Propane	2.1825	52.380	9.5593
Isobutane	0.5901	14.164	2.5848
n-Butane	1.3387	32.128	5.8634
Isopentane	0.3802	9.125	1.6652

n-Pentane	0.4139	9.935	1.8131
n-Hexane	0.2348	5.634	1.0282
Cyclohexane	0.1768	4.242	0.7742
Other Hexanes	0.3718	8.923	1.6285
Heptanes	0.7654	18.371	3.3527
Methylcyclohexane	0.3746	8.990	1.6407
2,2,4-Trimethylpentane	0.0038	0.092	0.0168
Benzene	0.4807	11.537	2.1056
Toluene	1.4812	35.548	6.4875
Ethylbenzene	0.1649	3.957	0.7221
Xylenes	1.7372	41.692	7.6088
C8+ Heavies	0.3010	7.224	1.3183
Total Emissions	16.4371	394.490	71.9944
Total Hydrocarbon Emissions	16.4371	394.490	71.9944
Total VOC Emissions	10.9975	263.941	48.1692
Total HAP Emissions	4.1025	98.460	17.9689
Total BTEX Emissions	3.8639	92.734	16.9240

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the
Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	31.6789	760.294	138.7536
Ethane	15.6419	375.404	68.5113
Propane	4.8784	117.081	21.3673
Isobutane	0.8668	20.803	3.7965
n-Butane	1.5050	36.120	6.5919
Isopentane	0.3720	8.928	1.6294
n-Pentane	0.3234	7.761	1.4164
n-Hexane	0.1007	2.417	0.4412
Cyclohexane	0.0180	0.433	0.0790
Other Hexanes	0.2100	5.040	0.9198
Heptanes	0.1576	3.783	0.6904
Methylcyclohexane	0.0298	0.716	0.1307
2,2,4-Trimethylpentane	0.0016	0.038	0.0069
Benzene	0.0074	0.176	0.0322
Toluene	0.0144	0.346	0.0631
Ethylbenzene	0.0009	0.022	0.0040
Xylenes	0.0069	0.165	0.0300
C8+ Heavies	0.0057	0.137	0.0249
Total Emissions	55.8193	1339.664	244.4886
Total Hydrocarbon Emissions	55.8193	1339.664	244.4886
Total VOC Emissions	8.4986	203.965	37.2237
Total HAP Emissions	0.1318	3.164	0.5774
Total BTEX Emissions	0.0295	0.709	0.1294

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	0.0975	2.341	0.4273
Ethane	0.1743	4.183	0.7634
Propane	0.1087	2.609	0.4762
Isobutane	0.0293	0.703	0.1283
n-Butane	0.0663	1.591	0.2904
Isopentane	0.0186	0.445	0.0813
n-Pentane	0.0200	0.480	0.0877
n-Hexane	0.0109	0.262	0.0479
Cyclohexane	0.0080	0.192	0.0351
Other Hexanes	0.0176	0.423	0.0773
Heptanes	0.0318	0.764	0.1395
Methylcyclohexane	0.0154	0.370	0.0675
2,2,4-Trimethylpentane	0.0002	0.004	0.0007
Benzene	0.0210	0.504	0.0920
Toluene	0.0525	1.259	0.2297
Ethylbenzene	0.0038	0.092	0.0168
Xylenes	0.0371	0.891	0.1626
C8+ Heavies	0.0002	0.005	0.0009
Total Emissions	0.7134	17.120	3.1245
Total Hydrocarbon Emissions	0.7134	17.120	3.1245
Total VOC Emissions	0.4415	10.597	1.9339
Total HAP Emissions	0.1255	3.012	0.5497
Total BTEX Emissions	0.1144	2.746	0.5011

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	147.3003	0.4273	99.71
Ethane	83.7897	0.7634	99.09
Propane	30.9266	0.4762	98.46
Isobutane	6.3813	0.1283	97.99
n-Butane	12.4552	0.2904	97.67
Isopentane	3.2946	0.0813	97.53
n-Pentane	3.2295	0.0877	97.29
n-Hexane	1.4694	0.0479	96.74
Cyclohexane	0.8532	0.0351	95.89
Other Hexanes	2.5483	0.0773	96.97
Heptanes	4.0431	0.1395	96.55
Methylcyclohexane	1.7714	0.0675	96.19
2,2,4-Trimethylpentane	0.0236	0.0007	97.05
Benzene	2.1378	0.0920	95.70
Toluene	6.5506	0.2297	96.49
Ethylbenzene	0.7261	0.0168	97.68
Xylenes	7.6388	0.1626	97.87
C8+ Heavies	1.3433	0.0009	99.93
Total Emissions	316.4829	3.1245	99.01
Total Hydrocarbon Emissions	316.4829	3.1245	99.01
Total VOC Emissions	85.3929	1.9339	97.74
Total HAP Emissions	18.5463	0.5497	97.04
Total BTEX Emissions	17.0533	0.5011	97.06

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	14.81 psia
Condenser Duty:	5.81e-002 MM BTU/hr
Hydrocarbon Recovery:	0.17 bbls/day
Produced Water:	1.41 bbls/day
Ambient Temperature:	60.00 deg. F
Excess Oxygen:	0.00 %
Combustion Efficiency:	95.00 %
Supplemental Fuel Requirement:	5.81e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	5.00%	95.00%
Ethane	5.00%	95.00%
Propane	4.98%	95.02%
Isobutane	4.96%	95.04%
n-Butane	4.95%	95.05%
Isopentane	4.88%	95.12%
n-Pentane	4.84%	95.16%
n-Hexane	4.65%	95.35%
Cyclohexane	4.53%	95.47%
Other Hexanes	4.75%	95.25%
Heptanes	4.16%	95.84%
Methylcyclohexane	4.11%	95.89%
2,2,4-Trimethylpentane	4.16%	95.84%
Benzene	4.37%	95.63%
Toluene	3.54%	96.46%
Ethylbenzene	2.33%	97.67%
Xylenes	2.14%	97.86%
C8+ Heavies	0.07%	99.93%

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:	0.30 lbs. H2O/MMSCF

Temperature:	50.0 deg. F
Pressure:	1440.0 psig
Dry Gas Flow Rate:	53.8000 MMSCF/day
Glycol Losses with Dry Gas:	0.6416 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	9.92 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	41.73 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.01%	96.99%
Carbon Dioxide	99.30%	0.70%
Nitrogen	99.94%	0.06%

Methane	99.96%	0.04%
Ethane	99.89%	0.11%
Propane	99.86%	0.14%
Isobutane	99.83%	0.17%
n-Butane	99.78%	0.22%
Isopentane	99.81%	0.19%
n-Pentane	99.75%	0.25%
n-Hexane	99.63%	0.37%
Cyclohexane	98.14%	1.86%
Other Hexanes	99.72%	0.28%
Heptanes	99.42%	0.58%
Methylcyclohexane	98.34%	1.66%
2,2,4-Trimethylpentane	99.80%	0.20%
Benzene	78.86%	21.14%
Toluene	72.54%	27.46%
Ethylbenzene	73.58%	26.42%
Xylenes	65.25%	34.75%
C8+ Heavies	99.85%	0.15%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 130.0 deg. F
Flash Pressure: 70.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.96%	0.04%
Carbon Dioxide	41.51%	58.49%
Nitrogen	5.75%	94.25%
Methane	5.80%	94.20%
Ethane	18.23%	81.77%
Propane	30.91%	69.09%
Isobutane	40.51%	59.49%
n-Butane	47.08%	52.92%
Isopentane	50.79%	49.21%
n-Pentane	56.36%	43.64%
n-Hexane	70.13%	29.87%
Cyclohexane	91.04%	8.96%
Other Hexanes	64.27%	35.73%
Heptanes	83.01%	16.99%
Methylcyclohexane	92.92%	7.08%
2,2,4-Trimethylpentane	71.35%	28.65%
Benzene	98.57%	1.43%
Toluene	99.11%	0.89%
Ethylbenzene	99.50%	0.50%
Xylenes	99.66%	0.34%
C8+ Heavies	98.37%	1.63%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead

Water	85.47%	14.53%
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	0.98%	99.02%
n-Pentane	0.89%	99.11%
n-Hexane	0.71%	99.29%
Cyclohexane	3.51%	96.49%
Other Hexanes	1.56%	98.44%
Heptanes	0.60%	99.40%
Methylcyclohexane	4.30%	95.70%
2,2,4-Trimethylpentane	2.10%	97.90%
Benzene	5.07%	94.93%
Toluene	7.97%	92.03%
Ethylbenzene	10.46%	89.54%
Xylenes	12.96%	87.04%
C8+ Heavies	12.20%	87.80%

STREAM REPORTS:

WET GAS STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 2.24e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.09e-002	2.22e+001
Carbon Dioxide	1.76e-001	4.58e+002
Nitrogen	2.96e-001	4.90e+002
Methane	8.69e+001	8.24e+004
Ethane	9.69e+000	1.72e+004
Propane	1.99e+000	5.18e+003
Isobutane	2.48e-001	8.52e+002
n-Butane	3.68e-001	1.26e+003
Isopentane	9.40e-002	4.01e+002
n-Pentane	6.80e-002	2.90e+002
n-Hexane	1.79e-002	9.12e+001
Cyclohexane	2.10e-003	1.04e+001
Other Hexanes	4.04e-002	2.06e+002
Heptanes	2.67e-002	1.58e+002
Methylcyclohexane	4.20e-003	2.44e+001
2,2,4-Trimethylpentane	4.00e-004	2.70e+000
Benzene	5.00e-004	2.31e+000
Toluene	1.00e-003	5.45e+000
Ethylbenzene	1.00e-004	6.28e-001
Xylenes	8.00e-004	5.02e+000
C8+ Heavies	2.00e-002	2.01e+002

Total Components	100.00	1.09e+005

DRY GAS STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 2.24e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.29e-004	6.70e-001
Carbon Dioxide	1.75e-001	4.55e+002
Nitrogen	2.96e-001	4.90e+002
Methane	8.70e+001	8.24e+004
Ethane	9.69e+000	1.72e+004
Propane	1.99e+000	5.18e+003
Isobutane	2.48e-001	8.50e+002
n-Butane	3.67e-001	1.26e+003
Isopentane	9.39e-002	4.00e+002
n-Pentane	6.79e-002	2.89e+002
n-Hexane	1.78e-002	9.08e+001
Cyclohexane	2.06e-003	1.03e+001
Other Hexanes	4.03e-002	2.05e+002
Heptanes	2.66e-002	1.57e+002
Methylcyclohexane	4.13e-003	2.40e+001
2,2,4-Trimethylpentane	3.99e-004	2.70e+000
Benzene	3.94e-004	1.82e+000
Toluene	7.26e-004	3.95e+000
Ethylbenzene	7.36e-005	4.62e-001
Xylenes	5.22e-004	3.28e+000
C8+ Heavies	2.00e-002	2.01e+002
Total Components	100.00	1.09e+005

LEAN GLYCOL STREAM

Temperature: 50.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.32e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	3.79e-012	3.20e-010
Nitrogen	3.23e-013	2.73e-011
Methane	1.34e-017	1.13e-015
Ethane	1.07e-007	9.03e-006
Propane	3.40e-009	2.87e-007
Isobutane	5.18e-010	4.37e-008
n-Butane	8.35e-010	7.05e-008
Isopentane	4.48e-005	3.78e-003
n-Pentane	4.39e-005	3.70e-003
n-Hexane	2.00e-005	1.69e-003
Cyclohexane	7.63e-005	6.44e-003
Other Hexanes	6.96e-005	5.88e-003
Heptanes	5.49e-005	4.64e-003
Methylcyclohexane	2.00e-004	1.68e-002

2,2,4-Trimethylpentane	9.72e-007	8.21e-005
Benzene	3.04e-004	2.57e-002
Toluene	1.52e-003	1.28e-001
Ethylbenzene	2.28e-004	1.93e-002
Xylenes	3.06e-003	2.59e-001
C8+ Heavies	4.95e-004	4.18e-002
Total Components	100.00	8.44e+003

RICH GLYCOL STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 1.52e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.74e+001	8.32e+003
Water	1.74e+000	1.48e+002
Carbon Dioxide	3.75e-002	3.20e+000
Nitrogen	3.20e-003	2.73e-001
Methane	3.94e-001	3.36e+001
Ethane	2.24e-001	1.91e+001
Propane	8.27e-002	7.06e+000
Isobutane	1.71e-002	1.46e+000
n-Butane	3.33e-002	2.84e+000
Isopentane	8.85e-003	7.56e-001
n-Pentane	8.68e-003	7.41e-001
n-Hexane	3.95e-003	3.37e-001
Cyclohexane	2.36e-003	2.01e-001
Other Hexanes	6.88e-003	5.88e-001
Heptanes	1.09e-002	9.28e-001
Methylcyclohexane	4.93e-003	4.21e-001
2,2,4-Trimethylpentane	6.41e-005	5.47e-003
Benzene	6.02e-003	5.14e-001
Toluene	1.90e-002	1.62e+000
Ethylbenzene	2.17e-003	1.85e-001
Xylenes	2.34e-002	2.00e+000
C8+ Heavies	4.08e-003	3.49e-001
Total Components	100.00	8.54e+003

FLASH TANK OFF GAS STREAM

Temperature: 130.00 deg. F
Pressure: 84.70 psia
Flow Rate: 1.03e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.08e-001	5.31e-002
Carbon Dioxide	1.57e+000	1.87e+000
Nitrogen	3.38e-001	2.58e-001
Methane	7.27e+001	3.17e+001
Ethane	1.91e+001	1.56e+001
Propane	4.07e+000	4.88e+000
Isobutane	5.49e-001	8.67e-001

n-Butane	9.53e-001	1.50e+000
Isopentane	1.90e-001	3.72e-001
n-Pentane	1.65e-001	3.23e-001
n-Hexane	4.30e-002	1.01e-001
Cyclohexane	7.89e-003	1.80e-002
Other Hexanes	8.97e-002	2.10e-001
Heptanes	5.79e-002	1.58e-001
Methylcyclohexane	1.12e-002	2.98e-002
2,2,4-Trimethylpentane	5.05e-004	1.57e-003
Benzene	3.46e-003	7.35e-003
Toluene	5.75e-003	1.44e-002
Ethylbenzene	3.20e-004	9.22e-004
Xylenes	2.38e-003	6.86e-003
C8+ Heavies	1.23e-003	5.69e-003
Total Components	100.00	5.80e+001

FLASH TANK GLYCOL STREAM

Temperature: 130.00 deg. F
Flow Rate: 1.51e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.80e+001	8.32e+003
Water	1.75e+000	1.48e+002
Carbon Dioxide	1.57e-002	1.33e+000
Nitrogen	1.85e-004	1.57e-002
Methane	2.30e-002	1.95e+000
Ethane	4.11e-002	3.49e+000
Propane	2.57e-002	2.18e+000
Isobutane	6.96e-003	5.90e-001
n-Butane	1.58e-002	1.34e+000
Isopentane	4.53e-003	3.84e-001
n-Pentane	4.92e-003	4.18e-001
n-Hexane	2.79e-003	2.36e-001
Cyclohexane	2.16e-003	1.83e-001
Other Hexanes	4.45e-003	3.78e-001
Heptanes	9.08e-003	7.70e-001
Methylcyclohexane	4.61e-003	3.91e-001
2,2,4-Trimethylpentane	4.61e-005	3.91e-003
Benzene	5.97e-003	5.06e-001
Toluene	1.90e-002	1.61e+000
Ethylbenzene	2.17e-003	1.84e-001
Xylenes	2.35e-002	2.00e+000
C8+ Heavies	4.04e-003	3.43e-001
Total Components	100.00	8.48e+003

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 6.15e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.38e+001	2.15e+001
Carbon Dioxide	1.86e+000	1.33e+000
Nitrogen	3.46e-002	1.57e-002
Methane	7.51e+000	1.95e+000
Ethane	7.16e+000	3.49e+000
Propane	3.06e+000	2.18e+000
Isobutane	6.27e-001	5.90e-001
n-Butane	1.42e+000	1.34e+000
Isopentane	3.25e-001	3.80e-001
n-Pentane	3.54e-001	4.14e-001
n-Hexane	1.68e-001	2.35e-001
Cyclohexane	1.30e-001	1.77e-001
Other Hexanes	2.66e-001	3.72e-001
Heptanes	4.72e-001	7.65e-001
Methylcyclohexane	2.36e-001	3.75e-001
2,2,4-Trimethylpentane	2.07e-003	3.82e-003
Benzene	3.80e-001	4.81e-001
Toluene	9.92e-001	1.48e+000
Ethylbenzene	9.59e-002	1.65e-001
Xylenes	1.01e+000	1.74e+000
C8+ Heavies	1.09e-001	3.01e-001
Total Components	100.00	3.93e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 4.11e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	2.06e+001	999548.
Carbon Dioxide	5.83e-003	1.20e-003	58.
Nitrogen	1.80e-006	3.70e-007	0.
Methane	4.31e-004	8.87e-005	4.
Ethane	8.75e-004	1.80e-004	9.
Propane	5.62e-004	1.16e-004	6.
Isobutane	8.25e-005	1.70e-005	1.
n-Butane	2.48e-004	5.10e-005	2.
Isopentane	4.89e-005	1.01e-005	0.
n-Pentane	5.66e-005	1.17e-005	1.
n-Hexane	2.56e-005	5.27e-006	0.
Cyclohexane	1.06e-004	2.18e-005	1.
Other Hexanes	3.33e-005	6.86e-006	0.
Heptanes	4.14e-005	8.52e-006	0.
Methylcyclohexane	9.73e-005	2.00e-005	1.
2,2,4-Trimethylpentane	1.38e-007	2.85e-008	0.
Benzene	7.84e-003	1.61e-003	78.
Toluene	1.61e-002	3.32e-003	161.
Ethylbenzene	8.89e-004	1.83e-004	9.

Xylenes	1.19e-002	2.45e-003	119.
C8+ Heavies	1.73e-007	3.56e-008	0.
Total Components	100.00	2.06e+001	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 5.09e-003 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.54e-002	9.83e-004
Carbon Dioxide	2.37e-002	5.13e-004
Nitrogen	1.66e-004	3.60e-006
Methane	1.20e-002	2.59e-004
Ethane	1.09e-001	2.36e-003
Propane	3.62e-001	7.84e-003
Isobutane	1.94e-001	4.19e-003
n-Butane	5.87e-001	1.27e-002
Isopentane	4.15e-001	8.98e-003
n-Pentane	6.31e-001	1.36e-002
n-Hexane	7.50e-001	1.62e-002
Cyclohexane	7.62e-001	1.65e-002
Other Hexanes	8.76e-001	1.89e-002
Heptanes	5.94e+000	1.28e-001
Methylcyclohexane	3.07e+000	6.64e-002
2,2,4-Trimethylpentane	2.95e-002	6.39e-004
Benzene	2.74e+000	5.92e-002
Toluene	1.98e+001	4.29e-001
Ethylbenzene	4.06e+000	8.79e-002
Xylenes	4.59e+001	9.92e-001
C8+ Heavies	1.37e+001	2.97e-001
Total Components	100.00	2.16e+000

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 14.81 psia
Flow Rate: 1.73e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.15e+001	9.47e-001
Carbon Dioxide	6.61e+000	1.33e+000
Nitrogen	1.23e-001	1.57e-002
Methane	2.67e+001	1.95e+000
Ethane	2.54e+001	3.49e+000
Propane	1.08e+001	2.17e+000
Isobutane	2.21e+000	5.86e-001
n-Butane	5.00e+000	1.33e+000
Isopentane	1.13e+000	3.71e-001
n-Pentane	1.22e+000	4.00e-001
n-Hexane	5.56e-001	2.19e-001
Cyclohexane	4.17e-001	1.60e-001
Other Hexanes	8.97e-001	3.53e-001

Heptanes	1.39e+000	6.37e-001
Methylcyclohexane	6.88e-001	3.08e-001
2,2,4-Trimethylpentane	6.11e-003	3.19e-003
Benzene	1.18e+000	4.20e-001
Toluene	2.50e+000	1.05e+000
Ethylbenzene	1.59e-001	7.68e-002
Xylenes	1.53e+000	7.43e-001
C8+ Heavies	5.43e-003	4.22e-003
Total Components	100.00	1.66e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 7.08e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	3.26e+001	9.75e-002
Ethane	3.11e+001	1.74e-001
Propane	1.32e+001	1.09e-001
Isobutane	2.70e+000	2.93e-002
n-Butane	6.12e+000	6.63e-002
Isopentane	1.38e+000	1.86e-002
n-Pentane	1.49e+000	2.00e-002
n-Hexane	6.80e-001	1.09e-002
Cyclohexane	5.11e-001	8.01e-003
Other Hexanes	1.10e+000	1.76e-002
Heptanes	1.70e+000	3.18e-002
Methylcyclohexane	8.41e-001	1.54e-002
2,2,4-Trimethylpentane	7.48e-003	1.59e-004
Benzene	1.44e+000	2.10e-002
Toluene	3.05e+000	5.25e-002
Ethylbenzene	1.94e-001	3.84e-003
Xylenes	1.88e+000	3.71e-002
C8+ Heavies	6.64e-003	2.11e-004
Total Components	100.00	7.13e-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	94.47	93.07	55.65
45.0	93.38	91.80	54.09
50.0	92.03	90.25	52.36
55.0	90.55	88.60	50.68
60.0	88.86	86.73	48.93
65.0	86.93	84.63	47.10
70.0	84.74	82.29	45.18
75.0	82.24	79.66	43.16
80.0	79.42	76.74	41.04

85.0	76.23	73.49	38.81
90.0	72.65	69.87	36.45
95.0	68.62	65.86	33.98
100.0	64.11	61.41	31.37
105.0	59.09	56.50	28.64
110.0	53.51	51.08	25.77
115.0	47.35	45.13	22.76
120.0	40.62	38.67	19.63
125.0	33.44	31.80	16.43
130.0	26.62	25.29	13.48
135.0	19.52	18.54	10.47
140.0	13.33	12.66	7.84
145.0	8.56	8.12	5.73
150.0	5.16	4.90	4.05
155.0	2.64	2.50	2.48
160.0	0.76	0.72	0.81
165.0	0.09	0.08	0.03
170.0	0.07	0.07	0.03

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	2.106	1.076	48.88
BTEX	16.924	3.483	79.42
Total HAP	17.969	4.161	76.84
VOC	48.169	28.224	41.41

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Miller Compressor Station - Gas Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2014Dec R13 Mod change engines\Miller_GLYCalc_Gas.ddf
Date: December 15, 2014

DESCRIPTION:

Description: Three identical dehydration units
Gas analysis 9/3/2014
53.8 MMSCFD/15 gpm
Flash tank recycled to stabilizer feed drum,
still vent condenser/combustion controls

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 50.00 deg. F
Pressure: 1440.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1760
Nitrogen	0.2960
Methane	86.9600
Ethane	9.6960
Propane	1.9890
Isobutane	0.2480
n-Butane	0.3680
Isopentane	0.0940
n-Pentane	0.0680
n-Hexane	0.0179
Cyclohexane	0.0021
Other Hexanes	0.0404
Heptanes	0.0267
Methylcyclohexane	0.0042
2,2,4-Trimethylpentane	0.0004
Benzene	0.0005
Toluene	0.0010
Ethylbenzene	0.0001
Xylenes	0.0008
C8+ Heavies	0.0200

DRY GAS:

Flow Rate: 53.8 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 15.0 gpm

PUMP:

```
            Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio:     0.080 acfm gas/gpm glycol
```

FLASH TANK:

```
                Flash Control: Recycle/recompression
                  Temperature:     130.0 deg. F
                     Pressure:      70.0 psig
```

REGENERATOR OVERHEADS CONTROL DEVICE:

```
               Control Device: Condenser
                  Temperature:     120.0 deg. F
                     Pressure:      14.8 psia

               Control Device: Combustion Device
        Destruction Efficiency:      95.0 %
                Excess Oxygen:       0.0 %
     Ambient Air Temperature:       60.0 deg. F
```

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Miller Compressor Station - Gas Pump
File Name: C:\Users\hmoseley\Dropbox\Flatrock OKC - Hillary\Access\Miller - WV\2014Dec R13 Mod change engines\Miller_GLYCalc_Gas.ddf
Date: December 15, 2014

DESCRIPTION:

Description: Three identical dehydration units
Gas analysis 9/3/2014
53.8 MMSCFD/15 gpm
Flash tank recycled to stabilizer feed drum,
still vent condenser/combustion controls

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1139	2.733	0.4987
Ethane	0.0974	2.337	0.4265
Propane	0.0598	1.436	0.2621
Isobutane	0.0155	0.371	0.0677
n-Butane	0.0318	0.764	0.1394
Isopentane	0.0104	0.250	0.0456
n-Pentane	0.0101	0.242	0.0442
n-Hexane	0.0057	0.137	0.0250
Cyclohexane	0.0047	0.112	0.0205
Other Hexanes	0.0094	0.227	0.0413
Heptanes	0.0178	0.427	0.0780
Methylcyclohexane	0.0094	0.226	0.0413
2,2,4-Trimethylpentane	0.0001	0.003	0.0005
Benzene	0.0165	0.396	0.0723
Toluene	0.0366	0.878	0.1602
Ethylbenzene	0.0023	0.056	0.0102
Xylenes	0.0223	0.535	0.0977
C8+ Heavies	0.0004	0.008	0.0015
Total Emissions	0.4641	11.139	2.0328
Total Hydrocarbon Emissions	0.4641	11.139	2.0328
Total VOC Emissions	0.2529	6.069	1.1076
Total HAP Emissions	0.0835	2.005	0.3659
Total BTEX Emissions	0.0777	1.865	0.3404

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	2.2779	54.670	9.9773
Ethane	1.9509	46.821	8.5449
Propane	1.2068	28.964	5.2859
Isobutane	0.3140	7.536	1.3753
n-Butane	0.6505	15.612	2.8491
Isopentane	0.2199	5.276	0.9629

n-Pentane	0.2156	5.173	0.9441
n-Hexane	0.1326	3.183	0.5809
Cyclohexane	0.1148	2.755	0.5028
Other Hexanes	0.2114	5.073	0.9258
Heptanes	0.5095	12.228	2.2317
Methylcyclohexane	0.2762	6.629	1.2097
2,2,4-Trimethylpentane	0.0032	0.078	0.0142
Benzene	0.4287	10.289	1.8777
Toluene	1.3779	33.070	6.0353
Ethylbenzene	0.1591	3.820	0.6971
Xylenes	1.6955	40.693	7.4265
C8+ Heavies	1.0081	24.195	4.4155
Total Emissions	12.7527	306.064	55.8566
Total Hydrocarbon Emissions	12.7527	306.064	55.8566
Total VOC Emissions	8.5238	204.572	37.3344
Total HAP Emissions	3.7971	91.132	16.6315
Total BTEX Emissions	3.6613	87.871	16.0365

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the
Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	392.9925	9431.819	1721.3069
Ethane	92.7717	2226.521	406.3401
Propane	28.5959	686.302	125.2501
Isobutane	4.8800	117.119	21.3743
n-Butane	7.7385	185.724	33.8946
Isopentane	2.2907	54.978	10.0335
n-Pentane	1.7938	43.051	7.8568
n-Hexane	0.6028	14.468	2.6403
Cyclohexane	0.1258	3.020	0.5511
Other Hexanes	1.2731	30.556	5.5764
Heptanes	1.1073	26.574	4.8498
Methylcyclohexane	0.2352	5.644	1.0300
2,2,4-Trimethylpentane	0.0140	0.336	0.0613
Benzene	0.0695	1.668	0.3045
Toluene	0.1415	3.397	0.6199
Ethylbenzene	0.0094	0.225	0.0411
Xylenes	0.0705	1.692	0.3088
C8+ Heavies	0.1818	4.364	0.7965
Total Emissions	534.8941	12837.458	2342.8361
Total Hydrocarbon Emissions	534.8941	12837.458	2342.8361
Total VOC Emissions	49.1299	1179.118	215.1891
Total HAP Emissions	0.9078	21.786	3.9760
Total BTEX Emissions	0.2909	6.982	1.2743

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr

Methane	0.1139	2.733	0.4987
Ethane	0.0974	2.337	0.4265
Propane	0.0598	1.436	0.2621
Isobutane	0.0155	0.371	0.0677
n-Butane	0.0318	0.764	0.1394
Isopentane	0.0104	0.250	0.0456
n-Pentane	0.0101	0.242	0.0442
n-Hexane	0.0057	0.137	0.0250
Cyclohexane	0.0047	0.112	0.0205
Other Hexanes	0.0094	0.227	0.0413
Heptanes	0.0178	0.427	0.0780
Methylcyclohexane	0.0094	0.226	0.0413
2,2,4-Trimethylpentane	0.0001	0.003	0.0005
Benzene	0.0165	0.396	0.0723
Toluene	0.0366	0.878	0.1602
Ethylbenzene	0.0023	0.056	0.0102
Xylenes	0.0223	0.535	0.0977
C8+ Heavies	0.0004	0.008	0.0015
Total Emissions	0.4641	11.139	2.0328
Total Hydrocarbon Emissions	0.4641	11.139	2.0328
Total VOC Emissions	0.2529	6.069	1.1076
Total HAP Emissions	0.0835	2.005	0.3659
Total BTEX Emissions	0.0777	1.865	0.3404

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Methane	1731.2842	0.4987	99.97
Ethane	414.8850	0.4265	99.90
Propane	130.5360	0.2621	99.80
Isobutane	22.7496	0.0677	99.70
n-Butane	36.7437	0.1394	99.62
Isopentane	10.9964	0.0456	99.59
n-Pentane	8.8010	0.0442	99.50
n-Hexane	3.2212	0.0250	99.22
Cyclohexane	1.0539	0.0205	98.06
Other Hexanes	6.5021	0.0413	99.36
Heptanes	7.0815	0.0780	98.90
Methylcyclohexane	2.2397	0.0413	98.16
2,2,4-Trimethylpentane	0.0755	0.0005	99.35
Benzene	2.1821	0.0723	96.69
Toluene	6.6552	0.1602	97.59
Ethylbenzene	0.7382	0.0102	98.62
Xylenes	7.7353	0.0977	98.74
C8+ Heavies	5.2120	0.0015	99.97
Total Emissions	2398.6928	2.0328	99.92
Total Hydrocarbon Emissions	2398.6928	2.0328	99.92
Total VOC Emissions	252.5236	1.1076	99.56
Total HAP Emissions	20.6075	0.3659	98.22
Total BTEX Emissions	17.3108	0.3404	98.03

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	120.00 deg. F
Condenser Pressure:	14.81 psia
Condenser Duty:	3.81e-002 MM BTU/hr
Hydrocarbon Recovery:	0.28 bbls/day
Produced Water:	1.40 bbls/day
Ambient Temperature:	60.00 deg. F
Excess Oxygen:	0.00 %
Combustion Efficiency:	95.00 %
Supplemental Fuel Requirement:	3.81e-002 MM BTU/hr

Component	Emitted	Destroyed
Methane	5.00%	95.00%
Ethane	4.99%	95.01%
Propane	4.96%	95.04%
Isobutane	4.92%	95.08%
n-Butane	4.89%	95.11%
Isopentane	4.74%	95.26%
n-Pentane	4.68%	95.32%
n-Hexane	4.31%	95.69%
Cyclohexane	4.08%	95.92%
Other Hexanes	4.47%	95.53%
Heptanes	3.49%	96.51%
Methylcyclohexane	3.41%	96.59%
2,2,4-Trimethylpentane	3.48%	96.52%
Benzene	3.85%	96.15%
Toluene	2.66%	97.34%
Ethylbenzene	1.46%	98.54%
Xylenes	1.32%	98.68%
C8+ Heavies	0.03%	99.97%

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:	0.30 lbs. H2O/MMSCF
Temperature:	50.0 deg. F
Pressure:	1440.0 psig
Dry Gas Flow Rate:	53.8000 MMSCF/day
Glycol Losses with Dry Gas:	0.6416 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	9.92 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	41.73 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.01%	96.99%
Carbon Dioxide	99.30%	0.70%
Nitrogen	99.94%	0.06%

Methane	99.96%	0.04%
Ethane	99.89%	0.11%
Propane	99.86%	0.14%
Isobutane	99.83%	0.17%
n-Butane	99.78%	0.22%
Isopentane	99.81%	0.19%
n-Pentane	99.75%	0.25%
n-Hexane	99.63%	0.37%
Cyclohexane	98.14%	1.86%
Other Hexanes	99.72%	0.28%
Heptanes	99.42%	0.58%
Methylcyclohexane	98.34%	1.66%
2,2,4-Trimethylpentane	99.80%	0.20%
Benzene	78.86%	21.14%
Toluene	72.54%	27.46%
Ethylbenzene	73.58%	26.42%
Xylenes	65.25%	34.75%
C8+ Heavies	99.85%	0.15%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 130.0 deg. F
Flash Pressure: 70.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.62%	0.38%
Carbon Dioxide	6.27%	93.73%
Nitrogen	0.57%	99.43%
Methane	0.58%	99.42%
Ethane	2.06%	97.94%
Propane	4.05%	95.95%
Isobutane	6.05%	93.95%
n-Butane	7.75%	92.25%
Isopentane	8.89%	91.11%
n-Pentane	10.89%	89.11%
n-Hexane	18.22%	81.78%
Cyclohexane	49.07%	50.93%
Other Hexanes	14.58%	85.42%
Heptanes	31.71%	68.29%
Methylcyclohexane	55.48%	44.52%
2,2,4-Trimethylpentane	19.14%	80.86%
Benzene	86.73%	13.27%
Toluene	91.41%	8.59%
Ethylbenzene	95.00%	5.00%
Xylenes	96.52%	3.48%
C8+ Heavies	85.24%	14.76%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead

Water	85.71%	14.29%
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	1.69%	98.31%
n-Pentane	1.69%	98.31%
n-Hexane	1.26%	98.74%
Cyclohexane	5.31%	94.69%
Other Hexanes	2.70%	97.30%
Heptanes	0.90%	99.10%
Methylcyclohexane	5.75%	94.25%
2,2,4-Trimethylpentane	2.48%	97.52%
Benzene	5.65%	94.35%
Toluene	8.52%	91.48%
Ethylbenzene	10.79%	89.21%
Xylenes	13.23%	86.77%
C8+ Heavies	3.98%	96.02%

STREAM REPORTS:

WET GAS STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 2.24e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.09e-002	2.22e+001
Carbon Dioxide	1.76e-001	4.58e+002
Nitrogen	2.96e-001	4.90e+002
Methane	8.69e+001	8.24e+004
Ethane	9.69e+000	1.72e+004
Propane	1.99e+000	5.18e+003
Isobutane	2.48e-001	8.52e+002
n-Butane	3.68e-001	1.26e+003
Isopentane	9.40e-002	4.01e+002
n-Pentane	6.80e-002	2.90e+002
n-Hexane	1.79e-002	9.12e+001
Cyclohexane	2.10e-003	1.04e+001
Other Hexanes	4.04e-002	2.06e+002
Heptanes	2.67e-002	1.58e+002
Methylcyclohexane	4.20e-003	2.44e+001
2,2,4-Trimethylpentane	4.00e-004	2.70e+000
Benzene	5.00e-004	2.31e+000
Toluene	1.00e-003	5.45e+000
Ethylbenzene	1.00e-004	6.28e-001
Xylenes	8.00e-004	5.02e+000
C8+ Heavies	2.00e-002	2.01e+002

Total Components	100.00	1.09e+005

DRY GAS STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 2.24e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.29e-004	6.70e-001
Carbon Dioxide	1.75e-001	4.55e+002
Nitrogen	2.96e-001	4.90e+002
Methane	8.70e+001	8.24e+004
Ethane	9.69e+000	1.72e+004
Propane	1.99e+000	5.18e+003
Isobutane	2.48e-001	8.50e+002
n-Butane	3.67e-001	1.26e+003
Isopentane	9.39e-002	4.00e+002
n-Pentane	6.79e-002	2.89e+002
n-Hexane	1.78e-002	9.08e+001
Cyclohexane	2.06e-003	1.03e+001
Other Hexanes	4.03e-002	2.05e+002
Heptanes	2.66e-002	1.57e+002
Methylcyclohexane	4.13e-003	2.40e+001
2,2,4-Trimethylpentane	3.99e-004	2.70e+000
Benzene	3.94e-004	1.82e+000
Toluene	7.26e-004	3.95e+000
Ethylbenzene	7.36e-005	4.62e-001
Xylenes	5.22e-004	3.28e+000
C8+ Heavies	2.00e-002	2.01e+002
Total Components	100.00	1.09e+005

LEAN GLYCOL STREAM

Temperature: 50.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.32e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	3.79e-012	3.20e-010
Nitrogen	3.23e-013	2.73e-011
Methane	1.34e-017	1.13e-015
Ethane	1.07e-007	9.03e-006
Propane	3.40e-009	2.87e-007
Isobutane	5.18e-010	4.37e-008
n-Butane	8.35e-010	7.05e-008
Isopentane	4.48e-005	3.78e-003
n-Pentane	4.39e-005	3.70e-003
n-Hexane	2.00e-005	1.69e-003
Cyclohexane	7.63e-005	6.44e-003
Other Hexanes	6.96e-005	5.88e-003
Heptanes	5.49e-005	4.64e-003
Methylcyclohexane	2.00e-004	1.68e-002

2,2,4-Trimethylpentane	9.72e-007	8.21e-005
Benzene	3.04e-004	2.57e-002
Toluene	1.52e-003	1.28e-001
Ethylbenzene	2.28e-004	1.93e-002
Xylenes	3.06e-003	2.59e-001
C8+ Heavies	4.95e-004	4.18e-002
Total Components	100.00	8.44e+003

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 50.00 deg. F
Pressure: 1454.70 psia
Flow Rate: 1.63e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.22e+001	8.32e+003
Water	1.64e+000	1.48e+002
Carbon Dioxide	5.78e-002	5.21e+000
Nitrogen	2.69e-002	2.42e+000
Methane	4.38e+000	3.95e+002
Ethane	1.05e+000	9.47e+001
Propane	3.30e-001	2.98e+001
Isobutane	5.76e-002	5.19e+000
n-Butane	9.30e-002	8.39e+000
Isopentane	2.79e-002	2.51e+000
n-Pentane	2.23e-002	2.01e+000
n-Hexane	8.17e-003	7.37e-001
Cyclohexane	2.74e-003	2.47e-001
Other Hexanes	1.65e-002	1.49e+000
Heptanes	1.80e-002	1.62e+000
Methylcyclohexane	5.86e-003	5.28e-001
2,2,4-Trimethylpentane	1.92e-004	1.73e-002
Benzene	5.81e-003	5.24e-001
Toluene	1.83e-002	1.65e+000
Ethylbenzene	2.08e-003	1.88e-001
Xylenes	2.24e-002	2.02e+000
C8+ Heavies	1.37e-002	1.23e+000
Total Components	100.00	9.02e+003

FLASH TANK OFF GAS STREAM

Temperature: 130.00 deg. F
Pressure: 84.70 psia
Flow Rate: 1.09e+004 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.08e-001	5.60e-001
Carbon Dioxide	3.86e-001	4.88e+000
Nitrogen	2.99e-001	2.41e+000
Methane	8.51e+001	3.93e+002
Ethane	1.07e+001	9.28e+001
Propane	2.25e+000	2.86e+001
Isobutane	2.92e-001	4.88e+000

n-Butane	4.63e-001	7.74e+000
Isopentane	1.10e-001	2.29e+000
n-Pentane	8.64e-002	1.79e+000
n-Hexane	2.43e-002	6.03e-001
Cyclohexane	5.20e-003	1.26e-001
Other Hexanes	5.13e-002	1.27e+000
Heptanes	3.84e-002	1.11e+000
Methylcyclohexane	8.32e-003	2.35e-001
2,2,4-Trimethylpentane	4.26e-004	1.40e-002
Benzene	3.09e-003	6.95e-002
Toluene	5.34e-003	1.42e-001
Ethylbenzene	3.07e-004	9.38e-003
Xylenes	2.31e-003	7.05e-002
C8+ Heavies	3.71e-003	1.82e-001
Total Components	100.00	5.43e+002

FLASH TANK GLYCOL STREAM

Temperature: 130.00 deg. F
Flow Rate: 1.51e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.81e+001	8.32e+003
Water	1.74e+000	1.48e+002
Carbon Dioxide	3.85e-003	3.27e-001
Nitrogen	1.63e-004	1.38e-002
Methane	2.69e-002	2.28e+000
Ethane	2.30e-002	1.95e+000
Propane	1.42e-002	1.21e+000
Isobutane	3.70e-003	3.14e-001
n-Butane	7.67e-003	6.50e-001
Isopentane	2.64e-003	2.24e-001
n-Pentane	2.59e-003	2.19e-001
n-Hexane	1.58e-003	1.34e-001
Cyclohexane	1.43e-003	1.21e-001
Other Hexanes	2.56e-003	2.17e-001
Heptanes	6.06e-003	5.14e-001
Methylcyclohexane	3.46e-003	2.93e-001
2,2,4-Trimethylpentane	3.91e-005	3.31e-003
Benzene	5.36e-003	4.54e-001
Toluene	1.78e-002	1.51e+000
Ethylbenzene	2.10e-003	1.78e-001
Xylenes	2.31e-002	1.95e+000
C8+ Heavies	1.24e-002	1.05e+000
Total Components	100.00	8.48e+003

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the
Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 5.67e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.85e+001	2.11e+001
Carbon Dioxide	4.97e-001	3.27e-001
Nitrogen	3.30e-002	1.38e-002
Methane	9.50e+000	2.28e+000
Ethane	4.34e+000	1.95e+000
Propane	1.83e+000	1.21e+000
Isobutane	3.62e-001	3.14e-001
n-Butane	7.49e-001	6.50e-001
Isopentane	2.04e-001	2.20e-001
n-Pentane	2.00e-001	2.16e-001
n-Hexane	1.03e-001	1.33e-001
Cyclohexane	9.13e-002	1.15e-001
Other Hexanes	1.64e-001	2.11e-001
Heptanes	3.40e-001	5.10e-001
Methylcyclohexane	1.88e-001	2.76e-001
2,2,4-Trimethylpentane	1.89e-003	3.23e-003
Benzene	3.67e-001	4.29e-001
Toluene	1.00e+000	1.38e+000
Ethylbenzene	1.00e-001	1.59e-001
Xylenes	1.07e+000	1.70e+000
C8+ Heavies	3.96e-001	1.01e+000
Total Components	100.00	3.42e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 4.09e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	2.04e+001	999607.
Carbon Dioxide	1.99e-003	4.06e-004	20.
Nitrogen	2.19e-006	4.48e-007	0.
Methane	6.97e-004	1.43e-004	7.
Ethane	6.79e-004	1.39e-004	7.
Propane	4.29e-004	8.78e-005	4.
Isobutane	6.04e-005	1.24e-005	1.
n-Butane	1.65e-004	3.38e-005	2.
Isopentane	3.81e-005	7.79e-006	0.
n-Pentane	3.96e-005	8.10e-006	0.
n-Hexane	1.86e-005	3.81e-006	0.
Cyclohexane	8.62e-005	1.76e-005	1.
Other Hexanes	2.48e-005	5.07e-006	0.
Heptanes	3.22e-005	6.58e-006	0.
Methylcyclohexane	8.28e-005	1.69e-005	1.
2,2,4-Trimethylpentane	1.36e-007	2.78e-008	0.
Benzene	8.58e-003	1.75e-003	86.
Toluene	1.56e-002	3.20e-003	156.
Ethylbenzene	7.49e-004	1.53e-004	7.

Xylenes	9.98e-003	2.04e-003	100.
C8+ Heavies	4.02e-007	8.23e-008	0.
Total Components	100.00	2.04e+001	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 8.14e-003 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.12e-002	1.43e-003
Carbon Dioxide	7.87e-003	2.73e-004
Nitrogen	1.45e-004	5.03e-006
Methane	1.95e-002	6.75e-004
Ethane	8.82e-002	3.06e-003
Propane	2.82e-001	9.78e-003
Isobutane	1.44e-001	4.98e-003
n-Butane	3.97e-001	1.37e-002
Isopentane	3.32e-001	1.15e-002
n-Pentane	4.02e-001	1.39e-002
n-Hexane	5.29e-001	1.83e-002
Cyclohexane	6.12e-001	2.12e-002
Other Hexanes	6.51e-001	2.25e-002
Heptanes	4.43e+000	1.53e-001
Methylcyclohexane	2.53e+000	8.77e-002
2,2,4-Trimethylpentane	2.83e-002	9.81e-004
Benzene	2.79e+000	9.68e-002
Toluene	1.86e+001	6.43e-001
Ethylbenzene	3.25e+000	1.13e-001
Xylenes	3.60e+001	1.25e+000
C8+ Heavies	2.89e+001	1.00e+000
Total Components	100.00	3.46e+000

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 14.81 psia
Flow Rate: 1.25e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.15e+001	6.82e-001
Carbon Dioxide	2.25e+000	3.26e-001
Nitrogen	1.50e-001	1.38e-002
Methane	4.32e+001	2.28e+000
Ethane	1.97e+001	1.95e+000
Propane	8.26e+000	1.20e+000
Isobutane	1.62e+000	3.09e-001
n-Butane	3.33e+000	6.37e-001
Isopentane	8.79e-001	2.08e-001
n-Pentane	8.50e-001	2.02e-001
n-Hexane	4.04e-001	1.14e-001
Cyclohexane	3.38e-001	9.36e-002
Other Hexanes	6.67e-001	1.89e-001

Component		
Heptanes	1.08e+000	3.56e-001
Methylcyclohexane	5.84e-001	1.88e-001
2,2,4-Trimethylpentane	6.00e-003	2.25e-003
Benzene	1.29e+000	3.30e-001
Toluene	2.42e+000	7.32e-001
Ethylbenzene	1.33e-001	4.65e-002
Xylenes	1.28e+000	4.46e-001
C8+ Heavies	1.26e-002	7.03e-003
Total Components	100.00	1.03e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 5.37e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	5.02e+001	1.14e-001
Ethane	2.29e+001	9.74e-002
Propane	9.60e+000	5.98e-002
Isobutane	1.88e+000	1.55e-002
n-Butane	3.87e+000	3.18e-002
Isopentane	1.02e+000	1.04e-002
n-Pentane	9.88e-001	1.01e-002
n-Hexane	4.69e-001	5.71e-003
Cyclohexane	3.93e-001	4.68e-003
Other Hexanes	7.75e-001	9.44e-003
Heptanes	1.26e+000	1.78e-002
Methylcyclohexane	6.79e-001	9.42e-003
2,2,4-Trimethylpentane	6.97e-003	1.13e-004
Benzene	1.49e+000	1.65e-002
Toluene	2.81e+000	3.66e-002
Ethylbenzene	1.55e-001	2.32e-003
Xylenes	1.49e+000	2.23e-002
C8+ Heavies	1.46e-002	3.51e-004
Total Components	100.00	4.64e-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	95.62	94.83	69.49
45.0	94.79	93.91	68.32
50.0	93.87	92.89	67.16
55.0	92.78	91.70	65.90
60.0	91.54	90.36	64.57
65.0	90.14	88.85	63.17
70.0	88.55	87.17	61.68
75.0	86.75	85.28	60.11
80.0	84.73	83.18	58.44

85.0	82.48	80.87	56.68
90.0	79.74	78.08	54.64
95.0	76.87	75.18	52.62
100.0	73.69	71.98	50.47
105.0	70.15	68.45	48.18
110.0	66.24	64.57	45.76
115.0	61.93	60.31	43.19
120.0	57.22	55.68	40.48
125.0	52.10	50.66	37.62
130.0	46.60	45.27	34.64
135.0	40.77	39.59	31.55
140.0	34.73	33.71	28.38
145.0	28.69	27.83	25.21
150.0	22.87	22.18	22.09
155.0	17.51	16.98	19.04
160.0	12.96	12.57	16.10
165.0	8.74	8.48	12.73
170.0	4.73	4.59	8.29

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	1.878	0.805	57.12
BTEX	16.036	2.452	84.71
Total HAP	16.632	2.791	83.22
VOC	37.334	15.435	58.66

element

Element Materials Technology
2129 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.: 15-091114-42 (361816) **DATE:** 09/11/14

FOR: ACCESS MIDSTREAM
ATTN: DEE BAILEY
190 MIDSTREAM WAY
JANE LEW WV 26378

SAMPLE IDENTIFICATION:
COMPANY: ACCESS MIDSTREAM
FIELD:
LEASE: MILLER CF INLET
STA #:

SAMPLE DATA: DATE: 09/03/14 10:00 **BY:** R. L.
PSIG: 897 **TEMP:** 103 **DEG.F.** **DP:** N/P **LBS H20**

REMARKS:

CYL #1458

SAMPLE TYPE: SPOT **EFFECTIVE DATE:** 10/01/14

HYDROCARBON ANALYSIS - METHOD GPA 2261-00 **LAB ANALYST:** MP

COMPONENT NAME		MOL PERCENT	GPM @ 14.730 PSIA
HYDROGEN SULFIDE	(H2S)	0.000	
CARBON DIOXIDE	(CO2)	0.176	
NITROGEN	(N2)	0.296	
METHANE	(C1)	86.960	
ETHANE	(C2)	9.696	2.592
PROPANE	(C3)	1.989	0.548
ISO-BUTANE	(IC4)	0.248	0.081
N-BUTANE	(NC4)	0.368	0.116
ISO-PENTANE	(IC5)	0.094	0.034
N-PENTANE	(NC5)	0.068	0.025
HEXANES PLUS	(C6+)	0.105	0.044
TOTAL		100.000	

ETHANE + GPM: 3.440
PROPANE + GPM: 0.848
ISO-PENTANE + GPM: 0.103

MOL WEIGHT: 18.47
BTU/LB: 23248.0

COMPRESSIBILITY FACTOR: 0.9973
SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1): 0.640

BTU/CUFT. (REAL) 60 DEG.F. - PSIA:	14.650	14.696	14.730	15.025
DRY:	1131.4	1135.0	1137.6	1160.4
SAT:	1111.6	1115.2	1117.8	1140.6

QUALITY OFFICER: Lisa Venable

2129 WEST WILLOW SCOTT LA 70583 337-232-3568

DATE: 09/11/14

SAMPLE IDENTIFICATION

COMPANY: ACCESS MIDSTREAM
FIELD:
LEASE: MILLER CF INLET
STA #:

SAMPLE DATE: 09/03/14
(361816)

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)	0.0042	0.0195
2,3-DIMETHYLBUTANE CYCLOPENTANE	0.0044	0.0186
2-METHYLPENTANE	0.0198	0.0884
3-METHYLPENTANE	0.0120	0.0561
N-HEXANE	0.0179	0.0836
2,2-DIMETHYLPENTANE	0.0009	0.0048
METHYLCYCLOPENTANE	0.0026	0.0120
2,4-DIMETHYLPENTANE	0.0001	0.0005
2,2,3-TRIMETHYLBUTANE	0.0003	0.0018
BENZENE	0.0005	0.0021
3,3-DIMETHYLPENTANE	0.0006	0.0032
CYCLOHEXANE	0.0021	0.0095
2-METHYLHEXANE	0.0053	0.0288
2,3-DIMETHYLPENTANE	0.0017	0.0093
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	0.0057	0.0307
1,t3-DIMETHYLCYCLOPENTANE	0.0002	0.0013
1,c3-DIMETHYLCYCLOPENTANE 3-ETHYLPENTANE	0.0007	0.0038

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
1,t2-DIMETHYLCYCLOPENTANE 2,2,4-TRIMETHYLPENTANE	0.0004	0.0021
N-HEPTANE	0.0056	0.0304
METHYLCYCLOHEXANE 1,1,3-TRIMETHYLCYCLOPENTANE 2,2-DIMETHYLHEXANE	0.0042	0.0226
1,C2-DIMETHYLCYCLOPENTANE	0.0000	0.0002
2,5-DIMETHYLHEXANE	0.0004	0.0026
2,4-DIMETHYLHEXANE 2,2,3-TRIMETHYLPENTANE ETHYLCYCLOPENTANE	0.0009	0.0050
1,t2,c4-TRIMETHYLCYCLOPENTANE 3,3-DIMETHYLHEXANE	0.0003	0.0019
1,t2,c3-TRIMETHYLCYCLOPENTANE	0.0001	0.0003
2,3,4-TRIMETHYLPENTANE	0.0000	0.0003
TOLUENE	0.0010	0.0050
2,3-DIMETHYLHEXANE	0.0004	0.0023
1,1,2-TRIMETHYLCYCLOPENTANE	0.0001	0.0005
2-METHYLHEPTANE	0.0015	0.0096
4-METHYLHEPTANE	0.0006	0.0039
3,4-DIMETHYLHEXANE	0.0002	0.0012
3-METHYLHEPTANE 3-ETHYLHEXANE	0.0019	0.0119
1,c3-DIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOPENTANE 1,c2,t4-TRIMETHYLCYCLOPENTANE	0.0006	0.0035
1,t4-DIMETHYLCYCLOHEXANE	0.0002	0.0014
2,2,5-TRIMETHYLHEXANE	0.0000	0.0003
1,1-DIMETHYLCYCLOHEXANE 1,methyl-t3-ETHYLCYCLOPENTANE	0.0001	0.0007
1-methyl-c3-ETHYLCYCLOPENTANE	0.0001	0.0004
1-methyl-t2-ETHYLCYCLOPENTANE 2,2,4-TRIMETHYLHEXANE	0.0000	0.0002
1-methyl-1-ETHYLCYCLOPENTANE CYCLOHEPTANE N-OCTANE	0.0017	0.0106
1,T2-DIMETHYLCYCLOCHEXANE	0.0001	0.0008

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
UNKNOWN	0.0000	0.0000
1,t3-DIMETHYLCYCLOHEXANE 1,c4-DIMETHYLCYCLOHEXANE 1,c2,c3-TRIMETHYLCYCLOPENTANE	0.0001	0.0009
2,4,4-TRIMETHYLHEXANE	0.0000	0.0001
ISOPROPYLCYCLOPENTANE	0.0000	0.0001
UNKNOWN	0.0000	0.0003
2,2-DIMETHYLHEPTANE	0.0001	0.0005
2,4-DIMETHYLHEPTANE 1-methyl-c2-ETHYLCYCLOPENTANE	0.0002	0.0010
2,2,3-TRIMETHYLHEXANE	0.0000	0.0002
1,c2-DIMETHYLCYCLOHEXANE 2,6-DIMETHYLHEPTANE	0.0002	0.0010
N-PROPYLCYCLOPENTANE 1,c3,c5-TRIMETHYLCYCLOHEXANE	0.0000	0.0003
2,5-DIMETHYLHEPTANE 3,5-DIMETHYLHEPTANE ETHYLCYCLOHEXANE	0.0005	0.0032
1,1,3-TRIMETHYLCYCLOHEXANE 2,3,3-TRIMETHYLHEXANE 3,3-DIMETHYLHEPTANE	0.0001	0.0008
1,1,4-TRIMETHYLCYCLOHEXANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
2,3,4-TRIMETHYLHEXANE	0.0000	0.0004
ETHYLBENZENE	0.0001	0.0005
1,t2,t4-TRIMETHYLCYCLOHEXANE 1,c3,t5-TRIMETHYLCYCLOHEXANE 2,3-DIMETHYLHEPTANE	0.0002	0.0012
M-XYLENE P-XYLENE 3,4-DIMETHYLHEPTANE	0.0007	0.0042
2-METHYLOCTANE 4-METHYLOCTANE	0.0008	0.0053
UNKNOWN	0.0000	0.0000
3-METHYLOCTANE	0.0005	0.0036
UNKNOWN	0.0000	0.0000
1,t2,c3-TRIMETHYLCYCLOHEXANE 1,t2,c4-TRIMETHYLCYCLOHEXANE	0.0000	0.0002

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
O-XYLENE	0.0001	0.0006
1,1,2-TRIMETHYLCYCLOHEXANE	0.0000	0.0003
UNKNOWN	0.0001	0.0004
ISOBUTYLCYCLOPENTANE	0.0000	0.0001
N-NONANE	0.0006	0.0038
UNKNOWN	0.0000	0.0000
1,c2,c3-TRIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOHEXANE	0.0000	0.0000
UNKNOWN	0.0000	0.0001
ISOPROPYLBENZENE	0.0000	0.0002
2,2-DIMETHYLOCTANE	0.0000	0.0002
ISOPROPYLCYCLOHEXANE CYCLOOCTANE	0.0001	0.0007
UNKNOWN	0.0000	0.0001
N-BUTYLCYCLOPENTANE N-PROPYLCYCLOHEXANE	0.0001	0.0006
3,3-DIMETHYLOCTANE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
N-PROPYLBENZENE	0.0001	0.0009
UNKNOWN	0.0000	0.0002
m-ETHYLTOLUENE	0.0000	0.0002
p-ETHYLTOLUENE 2,3-DIMETHYLOCTANE	0.0000	0.0003
4-METHYLNONANE 5-METHYLNONANE 1,3,5-TRIMETHYLBENZENE	0.0002	0.0011
2-METHYLNONANE	0.0002	0.0015
3-ETHYLOCTANE	0.0001	0.0009
O-ETHYLTOLUENE 3-METHYLNONANE	0.0001	0.0009
UNKNOWN	0.0000	0.0000
1,2,4-TRIMETHYLBENZENE t-BUTYLBENZENE METHYLCYCLOOCTANE	0.0000	0.0001
tert-BUTYLCYCLOHEXANE	0.0001	0.0005

CAPILLARY ANALYSIS - METHOD GPA 2286-95
COMPONENTS AS % OF TOTAL SAMPLE

COMPONENT	MOL PERCENT	WT. PERCENT
ISO-BUTYLCYCLOHEXANE	0.0000	0.0001
N-DECANE	0.0002	0.0015
ISOBUTYLBENZENE	0.0000	0.0000
sec-BUTYLBENZENE	0.0000	0.0003
UNKNOWN	0.0000	0.0001
1-METHYL-3-ISOPROPYLBENZENE	0.0000	0.0002
1,2,3-TRIMETHYLBENZENE 1-METHYL-4-ISOPROPYLBENZENE	0.0000	0.0002
UNKNOWN	0.0000	0.0000
1-METHYL-2-ISOPROPYLBENZENE	0.0000	0.0003
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOHEXANE	0.0000	0.0002
UNKNOWN	0.0000	0.0002
1,3-DIETHYLBENZENE 1-METHYL-3-PROPYLBENZENE	0.0000	0.0001
1,2-DIETHYLBENZENE N-BUTYLBENZENE 1-METHYL-4-PROPYLBENZENE	0.0000	0.0001
1,4-DIETHYLBENZENE	0.0000	0.0002
1-METHYL-2-PROPYLBENZENE	0.0000	0.0003
1,4-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0003
UNKNOWN	0.0000	0.0003
1,2-DIMETHYL-4-ETHYLBENZENE	0.0000	0.0001
1,3-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0003
UNKNOWN	0.0000	0.0000
1,2-DIMETHYL-3-ETHYLBENZENE	0.0000	0.0000
UNKNOWN	0.0000	0.0000
N-UNDECANE	0.0001	0.0009
UNKNOWN	0.0000	0.0000
1,2,4,5-TETRAMETHYLBENZENE	0.0000	0.0000
1,2,3,5-TETRAMETHYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0001
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	0.0002
NAPHTHALENE	0.0000	0.0001
N-DODECANE	0.0000	0.0003
ISOTRIDECANES PLUS	0.0000	0.0000
TOTALS	0.1050	0.5360

TOTAL HEXANES	=	0.0583	0.2662
TOTAL HEPTANES	=	0.0267	0.1403
TOTAL OCTANES	=	0.0144	0.0852
TOTAL NONANES	=	0.0043	0.0291
TOTAL DECANES PLUS	=	0.0013	0.0152

SAMPLE IDENTIFICATION

DATE: 09/11/14

COMPANY: ACCESS MIDSTREAM
FIELD:
LEASE: MILLER CF INLET
STA #:

SAMPLE DATE: 09/03/14
(361816)

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)	3.957	3.630
2,3-DIMETHYLBUTANE CYCLOPENTANE	4.183	3.478
2-METHYLPENTANE	17.937	16.441
3-METHYLPENTANE	11.411	10.466
N-HEXANE	17.013	15.594
2,2-DIMETHYLPENTANE	0.846	0.903
METHYLCYCLOPENTANE	2.510	2.244
2,4-DIMETHYLPENTANE	0.085	0.088
2,2,3-TRIMETHYLBUTANE	0.310	0.328
BENZENE	0.461	0.385
3,3-DIMETHYLPENTANE	0.564	0.601
CYCLOHEXANE	1.983	1.772
2-METHYLHEXANE	5.038	5.370
2,3-DIMETHYLPENTANE	1.626	1.731
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	5.386	5.733
1,t3-DIMETHYLCYCLOPENTANE	0.235	0.244

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
1,c3-DIMETHYLCYCLOPENTANE 3-ETHYLPENTANE	0.677	0.707
1,t2-DIMETHYLCYCLOPENTANE 2,2,4-TRIMETHYLPENTANE	0.367	0.388
N-HEPTANE	5.320	5.668
METHYLCYCLOHEXANE 1,1,3-TRIMETHYLCYCLOPENTANE 2,2-DIMETHYLHEXANE	3.985	4.225
1,C2-DIMETHYLCYCLOPENTANE	0.028	0.034
2,5-DIMETHYLHEXANE	0.404	0.493
2,4-DIMETHYLHEXANE 2,2,3-TRIMETHYLPENTANE ETHYLCYCLOPENTANE	0.855	0.933
1,t2,c4-TRIMETHYLCYCLOPENTANE 3,3-DIMETHYLHEXANE	0.291	0.349
1,t2,c3-TRIMETHYLCYCLOPENTANE	0.056	0.065
2,3,4-TRIMETHYLPENTANE	0.047	0.061
TOLUENE	0.949	0.934
2,3-DIMETHYLHEXANE	0.348	0.428
1,1,2-TRIMETHYLCYCLOPENTANE	0.075	0.086
2-METHYLHEPTANE	1.476	1.795
4-METHYLHEPTANE	0.602	0.736
3,4-DIMETHYLHEXANE	0.179	0.216
3-METHYLHEPTANE 3-ETHYLHEXANE	1.823	2.219
1,c3-DIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOPENTANE 1,c2,t4-TRIMETHYLCYCLOPENTANE	0.545	0.650
1,t4-DIMETHYLCYCLOHEXANE	0.216	0.258
2,2,5-TRIMETHYLHEXANE	0.038	0.049
1,1-DIMETHYLCYCLOHEXANE 1,methyl-t3-ETHYLCYCLOPENTANE	0.113	0.138
1-methyl-c3-ETHYLCYCLOPENTANE	0.056	0.069
1-methyl-t2-ETHYLCYCLOPENTANE 2,2,4-TRIMETHYLHEXANE	0.019	0.030
1-methyl-1-ETHYLCYCLOPENTANE CYCLOHEPTANE N-OCTANE	1.635	1.984

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
1,T2-DIMETHYLCYCLOCHEXANE	0.122	0.148
UNKNOWN	0.000	0.001
1,t3-DIMETHYLCYCLOHEXANE 1,c4-DIMETHYLCYCLOHEXANE 1,c2,c3-TRIMETHYLCYCLOPENTANE	0.141	0.171
2,4,4-TRIMETHYLHEXANE	0.009	0.011
ISOPROPYLCYCLOPENTANE	0.009	0.014
UNKNOWN	0.038	0.052
2,2-DIMETHYLHEPTANE	0.066	0.092
2,4-DIMETHYLHEPTANE 1-methyl-c2-ETHYLCYCLOPENTANE	0.150	0.188
2,2,3-TRIMETHYLHEXANE	0.028	0.043
1,c2-DIMETHYLCYCLOHEXANE 2,6-DIMETHYLHEPTANE	0.160	0.194
N-PROPYLCYCLOPENTANE 1,c3,c5-TRIMETHYLCYCLOHEXANE	0.047	0.058
2,5-DIMETHYLHEPTANE 3,5-DIMETHYLHEPTANE ETHYLCYCLOHEXANE	0.498	0.598
1,1,3-TRIMETHYLCYCLOHEXANE 2,3,3-TRIMETHYLHEXANE 3,3-DIMETHYLHEPTANE	0.103	0.144
1,1,4-TRIMETHYLCYCLOHEXANE	0.019	0.024
UNKNOWN	0.000	0.006
2,3,4-TRIMETHYLHEXANE	0.047	0.067
ETHYLBENZENE	0.075	0.088
1,t2,t4-TRIMETHYLCYCLOHEXANE 1,c3,t5-TRIMETHYLCYCLOHEXANE 2,3-DIMETHYLHEPTANE	0.169	0.221
M-XYLENE P-XYLENE 3,4-DIMETHYLHEPTANE	0.696	0.786
2-METHYLOCTANE 4-METHYLOCTANE	0.733	0.997
UNKNOWN	0.000	0.006
3-METHYLOCTANE	0.489	0.664
UNKNOWN	0.000	0.006

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
1,t2,c3-TRIMETHYLCYCLOHEXANE 1,t2,c4-TRIMETHYLCYCLOHEXANE	0.028	0.040
O-XYLENE	0.094	0.104
1,1,2-TRIMETHYLCYCLOHEXANE	0.038	0.053
UNKNOWN	0.056	0.079
ISOBUTYLCYCLOPENTANE	0.019	0.027
N-NONANE	0.526	0.712
UNKNOWN	0.000	0.000
1,c2,c3-TRIMETHYLCYCLOHEXANE 1,c2,t3-TRIMETHYLCYCLOHEXANE	0.000	0.000
UNKNOWN	0.009	0.014
ISOPROPYLBENZENE	0.038	0.046
2,2-DIMETHYLOCTANE	0.028	0.042
ISOPROPYLCYCLOHEXANE CYCLOOCTANE	0.103	0.129
UNKNOWN	0.019	0.021
N-BUTYLCYCLOPENTANE N-PROPYLCYCLOHEXANE	0.094	0.121
3,3-DIMETHYLOCTANE	0.019	0.034
UNKNOWN	0.000	0.000
N-PROPYLBENZENE	0.132	0.168
UNKNOWN	0.028	0.038
m-ETHYLTOLUENE	0.028	0.036
p-ETHYLTOLUENE 2,3-DIMETHYLOCTANE	0.047	0.064
4-METHYLNONANE 5-METHYLNONANE 1,3,5-TRIMETHYLBENZENE	0.150	0.207
2-METHYLNONANE	0.188	0.280
3-ETHYLOCTANE	0.113	0.164
O-ETHYLTOLUENE 3-METHYLNONANE	0.113	0.159
UNKNOWN	0.009	0.009
1,2,4-TRIMETHYLBENZENE t-BUTYLBENZENE METHYLCYCLOOCTANE	0.019	0.023

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
tert-BUTYLCYCLOHEXANE	0.056	0.084
ISO-BUTYLCYCLOHEXANE	0.009	0.012
N-DECANE	0.188	0.280
ISOBUTYLBENZENE	0.000	0.002
sec-BUTYLBENZENE	0.038	0.055
UNKNOWN	0.009	0.018
1-METHYL-3-ISOPROPYLBENZENE	0.028	0.046
1,2,3-TRIMETHYLBENZENE 1-METHYL-4-ISOPROPYLBENZENE	0.028	0.037
UNKNOWN	0.000	0.007
1-METHYL-2-ISOPROPYLBENZENE	0.038	0.047
UNKNOWN	0.009	0.009
N-BUTYLCYCLOHEXANE	0.019	0.031
UNKNOWN	0.019	0.034
1,3-DIETHYLBENZENE 1-METHYL-3-PROPYLBENZENE	0.019	0.022
1,2-DIETHYLBENZENE N-BUTYLBENZENE 1-METHYL-4-PROPYLBENZENE	0.009	0.017
1,4-DIETHYLBENZENE	0.028	0.041
1-METHYL-2-PROPYLBENZENE	0.038	0.055
1,4-DIMETHYL-2-ETHYLBENZENE	0.038	0.051
UNKNOWN	0.038	0.059
1,2-DIMETHYL-4-ETHYLBENZENE	0.009	0.015
1,3-DIMETHYL-2-ETHYLBENZENE	0.047	0.063
UNKNOWN	0.000	0.006
1,2-DIMETHYL-3-ETHYLBENZENE	0.000	0.001
UNKNOWN	0.000	0.005
N-UNDECANE	0.103	0.167
UNKNOWN	0.000	0.002
1,2,4,5-TETRAMETHYLBENZENE	0.000	0.004
1,2,3,5-TETRAMETHYLBENZENE	0.009	0.012
UNKNOWN	0.009	0.020

CAPILLARY ANALYSIS - METHOD GPA 2286-95
HEAVY END FRACTION

COMPONENT	MOL PERCENT	WT. PERCENT
1,2,3,4-TETRAMETHYLBENZENE CYCLODECANE	0.000	0.003
UNKNOWN	0.019	0.041
NAPHTHALENE	0.019	0.023
N-DODECANE	0.028	0.059
ISOTRIDECANES PLUS	0.000	0.000
TOTALS	100.000	100.000

SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1)	3.2456
MOLECULAR WEIGHT	93.99
COMPRESSIBILITY FACTOR	0.8744
SUMMATION FACTOR	0.0924
CU. FT. VAPOR/GAL @ 14.696 PSIA & 60 DEG. F.	23.727
CU. FT. VAPOR/GAL @ 14.730 PSIA & 60 DEG. F.	23.672
BTU/CU.FT. @ 14.696 PSIA, DRY	5122.60
BTU/CU.FT. @ 14.730 PSIA, DRY	5134.50
BTU/LB	20676