



Williams Ohio Valley Midstream LLC  
Park Place Corporate Center 2  
2000 Commerce Drive  
Pittsburgh, PA 15275  
(412) 787-7300  
(412) 787-6002 fax

June 12, 2015  
(Sent Via Federal Express)

Beverly McKeone  
New Source Review Program Manager  
Division of Air Quality  
**West Virginia Department of Environmental Protection**  
601 57th Street SE  
Charleston, WV 25304

**Subject: Application for 45CSR13 NSR Modification Permit  
Williams Ohio Valley Midstream LLC  
CONNER COMPRESSOR STATION  
Marshall County, West Virginia**

Dear Ms. McKeone:

Williams Ohio Valley Midstream LLC (OVM) is submitting the enclosed Application for 45CSR13 New Source Review (NSR) Modification Permit for the existing Conner Compressor Station located approximately 2.3 miles south-southwest of Moundsville, Marshall County, West Virginia.

This Application for 45CSR13 NSR Modification Permit has been prepared and submitted to provide for construction and operation of the following equipment:

- Two (2) 1,380 bhp CAT G3516B Compressor Engines, each w/ OxCat (CE-01 and -02)
- One (1) 203 bhp Caterpillar G3306B TA Compressor Engine w/ NSCR (CE-03)
- Two (2) 200 bhp Electric Driven Reciprocating Gas Compressors (CM)
- Compressor Rod-Packing and Engine Crankcase Leaks (RPC)  
(Formerly known as Miscellaneous Equipment Leaks (FUG-2))
- Start/Stop/Maintenance (Blowdown/Purge/Filter Change-Out - via Dispersion Stack) (SSM)
- Two (2) 1.66 MMBtu/hr Reboilers (RBV-01 and -02)
- Two (2) 60.0 MMscfd Triethylene Glycol Dehydrators (RSV-01 and RSV-02)
- One (1) 6.4 MMBtu/hr Thermal Oxidizer (COMB-1)
- One (1) 1.55 MMBtu/hr Heater-Treater (HTR-01)
- One (1) 2.55 MMBtu/hr Condensate Stabilizer Heater (HTR-02)
- One (1) 1.66 MMBtu/hr Station Recycle Line Heater (HTR-03)
- One (1) 9.7 MMBtu/hr NEW Condensate Stabilizer Heater (HTR-04)
- One (1) 48 bbl Produced Water Storage Tank (T01)
- One (1) 210 bbl Produced Water Storage Tank (T02)
- Produced Water Truck Load-out emissions (TLO-01)
- Stabilized Condensate Truck Load-out emissions (TLO-02)
- Fugitive Emissions from Process Piping and Equipment (FUG-G and -L)

These modifications will result in an increase in facility-wide emissions as summarized below:

**EMISSIONS SUMMARY SHEET**

Facility-Wide Emissions Summary [Tons per Year]			
Criteria Pollutants	Potential Emissions		
	Current Permit	Change	Proposed Permit
Nitrogen Oxides (NOX)	20.91	3.29	24.20
Carbon Monoxide (CO)	13.92	9.86	23.78
Point - Volatile Organic Compounds (VOC)	68.99	21.15	90.14
Fugitive - Volatile Organic Compounds (VOC)	33.11	6.81	39.93
Total - Volatile Organic Compounds (VOC)	102.10	27.96	130.06
Sulfur Dioxide (SO <sub>2</sub> )	0.10	0.02	0.13
Particulate Matter (PM <sub>10/2.5</sub> )	1.58	0.39	1.98
Lead (Pb)	---	---	---
Hazardous Air Pollutants (HAP)	Potential Emissions (Including Fugitives)		
	Current Permit	Change	Proposed Permit
Benzene	1.61	(0.67)	0.94
Ethylbenzene	1.43	(0.50)	0.93
Formaldehyde (HCHO)	2.82	0.00	2.82
n-Hexane	2.76	(0.56)	2.19
Methanol (MeOH)	---	0.05	0.05
Toluene	2.27	(0.65)	1.62
2,2,4-Trimethylpentane (i-Octane, TMP)	---	1.42	1.42
Xylenes	3.19	(0.67)	2.52
Other HAP (Acetaldehyde, MeCL, etc.)	---	0.19	0.19
Total HAP	14.09	(1.41)	12.68
Greenhouse Gases (GHG)	Potential Emissions (Including Fugitives)		
	Current Permit	Change	Proposed Permit
Carbon Dioxide (CO <sub>2</sub> )	22,115	5,867	27,982
Methane (CH <sub>4</sub> )	195.75	34.20	229.95
Nitrous Oxide (N <sub>2</sub> O)	0.04	0.22	0.26
CO <sub>2</sub> Equivalent (CO <sub>2</sub> e)	27,020	6,789	33,808
<p>The increases in NO<sub>x</sub>, CO, SO<sub>2</sub>, PM<sub>10/2.5</sub>, and CO<sub>2</sub>e emissions are primarily due to incremental fuel combustion in the New 9.7 MMBtu/hr Condensate Stabilizer Heater (HTR-04 (20E)).</p> <p>The increases in NO<sub>x</sub> emissions are somewhat off-set, and the increase in CO emissions are further increased, because of utilization of revised AP-42 emission factors for flares (COMB-1 (10E)).</p> <p>The increases in VOC emissions are primarily the result of additional Rod Packing emissions from Two (2) 200 bhp Electric Motor Driven Compressors (RPC (18E)).</p> <p>Additional increases in VOC emissions and the net decreases in Total HAP emissions are the result of incremental component counts (SSM (16E)) and utilization of improved condensate sampling data (TLO-02 (15E) and FUG-L (17E)).</p>			

Beverly McKeone  
WVDEP – Division of Air Quality  
June 12, 2015  
Page 03 of 03

The facility continues to qualify as a Minor Source under Non-Attainment New Source Review (NNSR), Prevention of Significant Deterioration (PSD), and Title V Operating Permits. The facility is also an Area Source for Hazardous Air Pollutants (HAP) under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.

If you have any questions concerning this submittal or need additional information, please contact me at (412) 787-4259 or [Danell.Zawaski@Williams.com](mailto:Danell.Zawaski@Williams.com).

Sincerely,



R. Danell Zawaski, P.E.  
Environmental Specialist

Enclosures:

Application for NSR Modification Permit  
Attachments A through S  
Check for Application Fee

**APPLICATION FOR  
45CSR13 NEW SOURCE REVIEW  
MODIFICATION PERMIT**

*For the:*

Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
Marshall County, West Virginia

*Submitted to:*



**WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
DIVISION OF AIR QUALITY**

*Submitted by:*



**Williams Ohio Valley Midstream LLC**  
Park Place Corporate Center 2  
2000 Commerce Drive  
Pittsburgh, PA 15275

*Prepared by:*



**EcoLogic Environmental Consultants, LLC**  
864 Windsor Court  
Santa Barbara, CA 93111

**June 2015**

**APPLICATION FOR  
45CSR13 NEW SOURCE REVIEW  
MODIFICATION PERMIT**

Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
Marshall County, West Virginia

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**APPLICATION FEE**

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**APPLICATION FOR  
45CSR13 NEW SOURCE REVIEW  
MODIFICATION PERMIT**

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- **SECTION I.     General**
  - **SECTION II.    Additional Attachments and Supporting Documents**
  - **SECTION III.   Certification of Information**
-



NTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475  
[www.dep.wv.gov/daq](http://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**     **NOT APPLICABLE**  
 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): <b>WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM)</b>		2. Federal Employer ID No. (FEIN): <b>27-0856707</b>	
3. Name of facility (if different from above): <b>CONNER COMPRESSOR STATION</b>		4. The applicant is the: <input type="checkbox"/> <b>OWNER</b> <input type="checkbox"/> <b>OPERATOR</b> <input checked="" type="checkbox"/> <b>BOTH</b>	
5A. Applicant's mailing address: <b>PARK PLACE CORPORATE CENTER 2 2000 COMMERCE DRIVE PITTSBURGH, PA 15275</b>		5B. Facility's present physical address: <b>SOUTH SIDE OF KULL LN 0.2 MI E OF ROBERTS RIDGE RD/CO-21 MOUNDSVILLE, WV 26041</b>	
6. <b>West Virginia Business Registration.</b> Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> <b>YES</b> <input checked="" type="checkbox"/> <b>NO</b> – If <b>YES</b> , provide a copy of the <b>Certificate of Incorporation/Organization/Limited Partnership</b> (one page) including any name change amendments or other Business Registration Certificate as <b>Attachment A</b> . – If <b>NO</b> , provide a copy of the <b>Certificate of Authority/Authority of L.L.C./Registration</b> (one page) including any name change amendments or other Business Certificate as <b>Attachment A</b> .			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: <b>THE WILLIAMS COMPANIES, INC.</b>			
8. Does the applicant own, lease, have an option to buy, or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> <b>YES</b> <input type="checkbox"/> <b>NO</b> – If <b>YES</b> , please explain: <b>APPLICANT OWNS THE COMPRESSOR STATION</b> – If <b>NO</b> , you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be <b>constructed, modified, relocated, administratively updated</b> or <b>temporarily permitted</b> (e.g., coal preparation plant, primary crusher, etc.): <b>NATURAL GAS COMPRESSOR STATION</b>		10. North American Industry Classification System (NAICS) code for the facility: <b>213112-SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS</b>	
11A. DAQ Plant ID No. (existing facilities): <b>051-00195</b>		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities): <b>R13-3168 - ISSUED 04/28/14</b>	
12A. Directions to the facility: – For <b>Modifications, Administrative Updates</b> or <b>Temporary permits</b> at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; – For <b>Construction</b> or <b>Relocation permits</b> , please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a <b>MAP</b> as <b>Attachment B</b> . <b>FROM 12TH ST/SR-872 IN MOUNDSVILLE: HEAD SOUTH ON SR-2/LAFAYETTE AVE FOR ~0.8 MI; TURN LEFT ONTO SR-2 ALT FOR ~250 FT; TURN LEFT ONTO CO-21/ROBERTS RIDGE RD FOR ~2.1 MI; TURN LEFT ONTO KULL LN ~0.2 MI; ENTRANCE TO SITE IS ON THE RIGHT</b>			

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

12.B. New site address (if applicable): <b>NA</b>	12C. Nearest city or town: <b>MOUNDSVILLE</b>	12D. County: <b>MARSHALL</b>
12.E. UTM Northing (KM): <b>4,414.56 km N Northing</b>	12F. UTM Easting (KM): <b>521.65 km Easting</b>	12G. UTM Zone: <b>17S</b>
13. Briefly describe the proposed change(s) at the facility:  <b>THIS APPLICATION IS PREPARED AND SUBMITTED TO REQUEST AUTHORIZATION TO INSTALL AND OPERATE:</b> <ul style="list-style-type: none"> <li>• <b>ONE (1) 9.7 MMBTU/HR CONDENSATE STABILIZATION HEATER 02 (HTR-04 (20E))</b></li> <li>• <b>TWO (2) 200 BHP ELECTRIC MOTOR DRIVEN GAS COMPRESSORS (CM)</b></li> <li>• <b>UPDATED EMISSION ESTIMATING PROTOCOLS</b></li> <li>• <b>UPDATED MAXIMUM DESIGN HEAT INPUT RATINGS FOR EXTERNAL COMBUSTION EQUIPMENT TO REFLECT HHV RATHER THAN LHV</b></li> </ul>		
14A. Provide the date of anticipated installation or change: – If this is an <b>After-The-Fact</b> permit application, provide the date upon which the proposed change did happen: <b>NA</b>		14B. Date of anticipated Start-Up if a permit is granted: <b>APPROXIMATELY ONE (1) MONTH AFTER PERMIT IS ISSUED</b>
14C. Provide a <b>Schedule</b> of the planned <b>Installation of/Change</b> to and <b>Start-Up</b> of each of the units proposed in this permit application as <b>Attachment C</b> (if more than one unit is involved).		
15. Provide maximum projected <b>Operating Schedule</b> of activity/activities outlined in this application: Hours Per Day: <b>24</b> Days Per Week: <b>7</b> Weeks Per Year: <b>52</b>		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> <b>YES</b> <input checked="" type="checkbox"/> <b>NO</b>		
17. <b>Risk Management Plans.</b> If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see <a href="http://www.epa.gov/ceppo">www.epa.gov/ceppo</a> ), submit your <b>Risk Management Plan (RMP)</b> to U.S. EPA Region III.		
18. <b>Regulatory Discussion.</b> List all Federal and State air pollution control regulations that you believe are applicable to the proposed process ( <i>if known</i> ). A list of possible applicable requirements is also included in <b>Attachment S</b> of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance ( <i>if known</i> ). Provide this information as <b>Attachment D</b> .		

### **Section II. Additional attachments and supporting documents.**

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate <b>application fee</b> (per 45CSR22 and 45CSR13).
20. Include a <b>Table of Contents</b> as the first page of your application package.
21. Provide a <b>Plot Plan</b> , 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 <b>Attachment E</b> (Refer to <b>Plot Plan Guidance</b> ). – Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).
22. Provide a <b>Detailed Process Flow Diagram(s)</b> showing each proposed or modified emissions unit, emission point and control device as <b>Attachment F</b> .
23. Provide a <b>Process Description</b> as <b>Attachment G</b> . – Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).
24. Provide <b>Material Safety Data Sheets (MSDS)</b> for all materials processed, used or produced as <b>Attachment H</b> . – For chemical processes, provide a MSDS for each compound emitted to the air.
25. Fill out the <b>Emission Units Table</b> and provide it as <b>Attachment I</b> .
26. Fill out the <b>Emission Points Data Summary Sheet (Table 1 and Table 2)</b> and provide it as <b>Attachment J</b> .
27. Fill out the <b>Fugitive Emissions Data Summary Sheet</b> and provide it as <b>Attachment K</b> .
<i>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</i>



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

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

**General Emission Unit, specify:**

- **NATURAL GAS-FIRED BOILER/LINE HEATER DATA SHEET**

(\*) **LEAK SOURCE DATA SHEET ONLY**

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

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

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input checked="" type="checkbox"/> <b>Flare</b>
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System

Other Collectors, specify:

- **OXIDATION CATALYST (OXCAT)**
- **NON-SELECTIVE CATALYTIC REDUCTION (NSCR)**

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:      **NA**

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

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

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

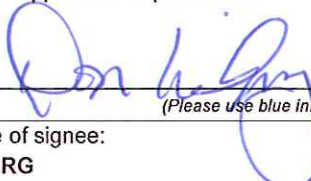
**35A. Certification of Information.** To certify this permit application, a Responsible Official (45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

**Certification of Truth, Accuracy, and Completeness**

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

**Compliance Certification**

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

SIGNATURE:   
(Please use blue ink)

DATE: 6/11/2015  
(Please use blue ink)

35B. Printed name of signee: <b>DON WICBURG</b>	35C. Title: <b>VICE PRESIDENT AND GENERAL MANAGER</b>	
35D. E-mail: <b>DON.WICBURG@WILLIAMS.COM</b>	36E. Phone: <b>(304) 843-3158</b>	36F. FAX: <b>(304) 843-3131</b>
36A. Printed name of contact person: <b>R. DANELL ZAWASKI, P.E.</b>	36B. Title: <b>ENVIRONMENTAL SPECIALIST</b>	
36C. E-mail: <b>DANELL.ZAWASKI@WILLIAMS.COM</b>	36D. Phone: <b>(412) 787-4259</b>	36E. FAX: <b>(412) 787-6002</b>

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

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

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

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

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

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

**ATTACHMENT A**  
**Business Certificate**

---

“6. **West Virginia Business Registration.** 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.”

---

- **Certificate of Amendment to the Certificate of Authority**  
From: CAIMAN EASTERN MIDSTREAM, LLC  
To: WILLIAMS OHIO VALLEY MIDSTREAM LLC  
Date: May 15, 2012
  
  - **Certificate of Authority of a Foreign Limited Liability Company**  
To: CAIMAN EASTERN MIDSTREAM, LLC  
Date: September 11, 2009
-

# State of West Virginia



## Certificate

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

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

**CAIMAN EASTERN MIDSTREAM, LLC**

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

### **CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY**

changing the name of the limited liability company to

**WILLIAMS OHIO VALLEY MIDSTREAM LLC**

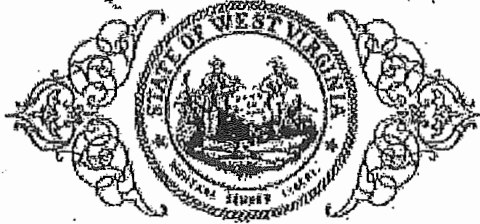


*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
May 15, 2012*

*Natalie E. Tennant*

*Secretary of State*

# State of West Virginia



## Certificate

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

**CAIMAN EASTERN MIDSTREAM, LLC**

Control Number: 99GIS

a limited liability company, organized under the laws of the State of Texas has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of September 11, 2009, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

### **CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY**

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

*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
September 11, 2009*



*Natalie E. Tennant*

Secretary of State

## ATTACHMENT B

### Topographic Map

---

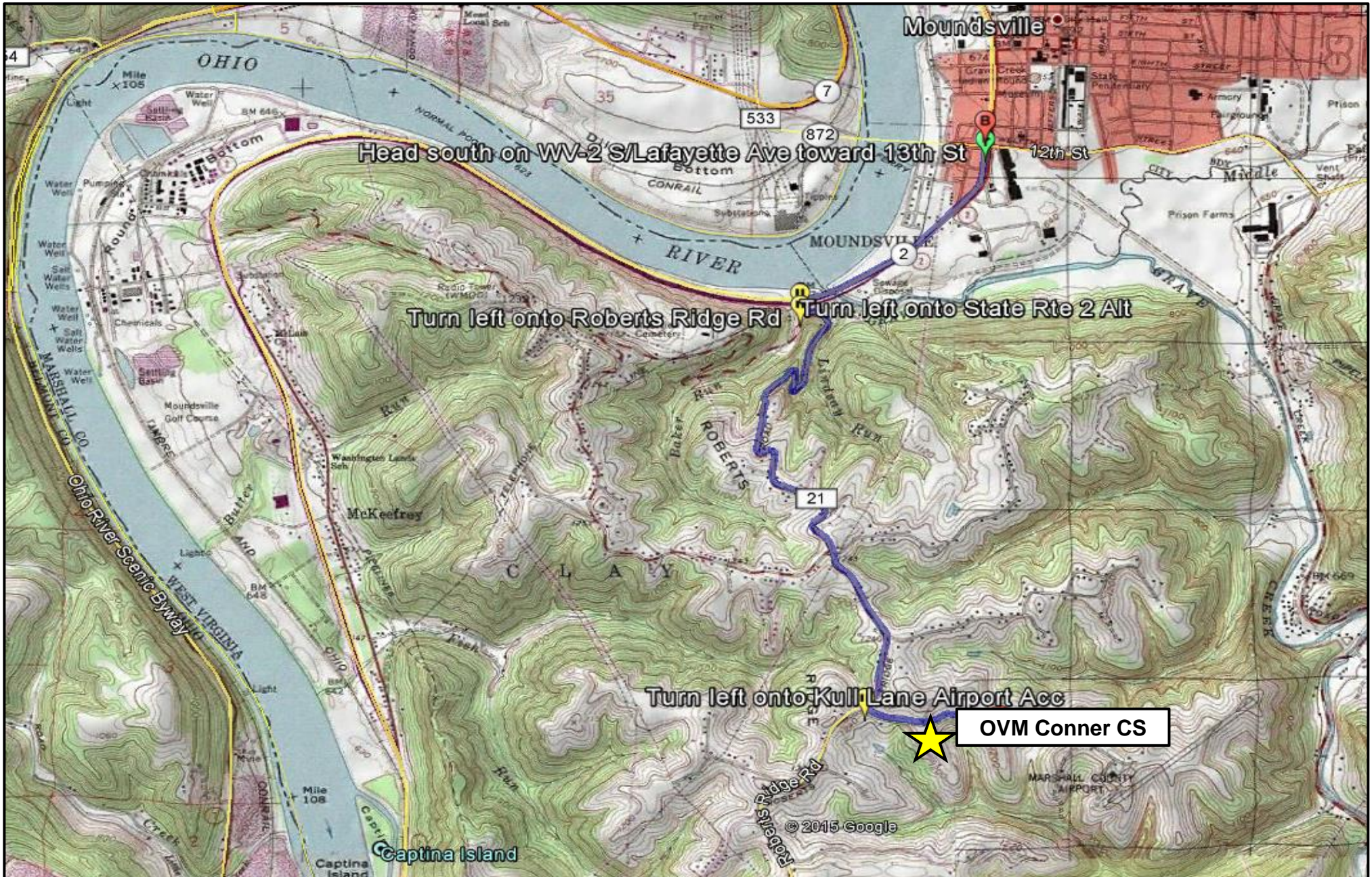
“12A. For **Modifications, Administrative Updates** or **Temporary** permits at an existing facility, please provide directions to the present location of the facility from the nearest state road. Include a MAP as Attachment B.”

---

- **Address:**  
South side of Kull Lane Airport Access Rd.  
~0.2 Miles East of Roberts Ridge Road/Co-21  
~2.3 Miles South-Southwest of Moundsville  
Moundsville, Marshall County, WV 26041
  - **Latitude and Longitude:**  
39°52'50.88" North x -80°44'48.48" West  
(39.8808° North x -80.7468° West)
  - **UTM:**  
4,414,558 m Northing x 521,650 m Easting x Zone 17S
  - **Elevation:**  
~1,230'
-



Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit  
**Attachment B - Location Map (Topo)**





## **ATTACHMENT C**

### **Installation and Start-Up Schedule**

---

“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.”

---

The OVM Conner Compressor Station is an existing operation. The modifications (i.e., New Condensate Stabilization Heater (HTR-04 (20E), Two New Electrically Driven Gas Compressors and Additional Pipeline Components) are scheduled to be implemented w/in approximately one (1) month following receipt of the NSR Modification Permit.

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## **ATTACHMENT D**

### **Regulatory Discussion**

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“18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (if known). Discuss applicability and proposed demonstration(s) of compliance (if known). Provide this information as Attachment D.”

---

- **Regulatory Discussion**
    - A. Applicability of New Source Review (NSR) Regulations
    - B. Applicability of Federal Regulations
    - C. Applicability of Source Aggregation
    - D. Applicability of State Regulations
-

Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit

**ATTACHMENT D**  
**Regulatory Discussion**

A. Applicability of New Source Review (NSR) Regulations

The following New Source Review (NSR) regulations are potentially applicable to natural gas production facilities. Applicability to the facility has been determined as follows:

**1. Prevention of Significant Deterioration (PSD)** [Not Applicable]

This rule does not apply. The facility is a “PSD Natural Minor Source” for each regulated pollutant, as follows:

- NOx: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- CO: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- VOC: PSD Synthetic Minor Source with Pre-Controlled PTE < 250 tpy
- SO<sub>2</sub>: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- PM<sub>10/2.5</sub>: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy

**2. Nonattainment New Source Review (NNSR)** [Not Applicable]

This rule does not apply. The facility is in a county that is classified as Non-Attainment for Fine Particulates and as Attainment for all other criteria pollutants. The facility qualifies as an “NNSR Natural Minor Source” as follows:

- PM<sub>10/2.5</sub>: NNSR Natural Minor Source with Pre-Controlled PTE < 100 tpy
- NOx: NNSR Natural Minor Source with Pre-Controlled PTE < 100 tpy
- SO<sub>2</sub>: NNSR Natural Minor Source with Pre-Controlled PTE < 100 tpy

**3. Major Source of Hazardous Air Pollutants (HAPs)** [Not Applicable]

This rule does not apply. The facility qualifies as a “HAP Area Source” as follows:

- Each HAP: HAP Area Source with Controlled Individual HAPs < 10 tpy
- Total HAPs: HAP Area Source with Controlled Total of All HAPs PTE < 25 tpy

**4. Title V Operating Permit** [Not Applicable]

This rule does not apply. With the requested Federally Enforceable Limits (FEL), the facility qualifies as a “Title V Synthetic Minor Source” as follows:

- NOx: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- CO: Title V Synthetic Minor Source with Controlled PTE < 100 tpy
- VOC: Title V Synthetic Minor Source with Controlled PTE < 100 tpy
- SO<sub>2</sub>: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- PM<sub>10/2.5</sub>: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- Each HAP: Title V Synthetic Minor Source with Controlled Individual HAPs PTE < 10 tpy

- Total HAPs: Title V Synthetic Minor Source with Controlled PTE < 25 tpy

B. Applicability of Federal Regulations

The following federal regulations are potentially applicable to natural gas production facilities. Applicability to the facility has been determined as follows:

**1. NSPS A, General Provisions**

40CFR§60.1-§60.19

[Applicable]

This rule does apply to all sources subject to an NSPS (unless a specific provision is excluded within the source NSPS). Requirements include monitoring, recordkeeping and reporting.

**2. NSPS Dc, Steam Generating Units**

40CFR§60.40c-§60.48c

[Not Applicable]

This rule does not apply to any of the heaters because each has a maximum design heat input capacity < 10 MMBtu/hr (§60.40c(a)).

**3. NSPS Kb, Volatile Organic Liquid Storage Vessels**

40CFR§60.110b-§60.117b

[Not Applicable]

This rule does not apply because each storage vessel has a design capacity < 75 m3 (19,813 gal, 472 bbl) (§60.110b(a)).

**4. NSPS GG, Stationary Gas Turbines**

40CFR§60.330-§60.335

[Not Applicable]

This rule does not apply because there is no stationary gas turbine at the facility (§60.330).

**5. NSPS KKK, Leaks from Natural Gas Processing Plants**

40CFR§60.630-§60.636

[Not Applicable]

This rule does not apply because the facility is not located at a natural gas processing plant that is engaged in the extraction of natural gas liquids from field gas (§60.630(e)).

**6. NSPS LLL, Onshore Natural Gas Processing: SO2 Emissions**

40CFR§60.640-§60.648

[Not Applicable]

This rule does not apply because there is no gas sweetening operation at the facility (§60.640(a)).

**7. NSPS IIII, Compression Ignition Reciprocating Internal Combustion Engines**

40CFR§60.4200-§60.4219

[Not Applicable]

This rule does not apply because there is no stationary compression ignition engine at the facility (§60.4200(a)).

**8. NSPS JJJJ, Stationary Spark Ignition (SI) Internal Combustion Engines (ICE)**

40CFR§60.4230-§60.4248

[Applicable]

This rule does apply to the 1,380 bhp Caterpillar G3516B compressor engines (CE-01 and CE-02) because the maximum engine power is greater than 500 HP and each engine was manufactured on or after 07/01/07 (§60.4230(a)(4)(i)). The rule does apply to the 203 bhp Caterpillar G3306B TA compressor engine (CE-03) because the maximum engine power is less than 500 HP and the engine was manufactured after 07/01/08 (§60.4230(a)(4)(iii)).

Requirements include NO<sub>x</sub>, CO and VOC emission limits (§60.4233(e-f)); operating limits (§60.4243); performance testing (§60.4244); and notification and recordkeeping (§60.4245).

**9. NSPS KKKK, Stationary Combustion Turbines**

40CFR§60.4300-§60.4420

[Not Applicable]

This rule does not apply because there is no stationary combustion turbine at the facility (§60.4305).

**10. NSPS OOOO, Crude Oil and Natural Gas Production**

40CFR§60.5360-§60.5430

[Applicable]

The facility is located within the natural gas production segment as it is between the wellhead and the point of custody transfer to the natural gas transmission and storage segment, not including natural gas processing plants.

This rule does apply to each reciprocating compressor driven by the Caterpillar G3516B engines and Caterpillar G3306B TA engine, as well as the two new electrically driven gas compressors, because each commenced construction after 08/23/11 (§60.5360 and §60.5365(c)). Requirements include replacing rod packing systems on a specified schedule (§60.5385(a)) and notification, monitoring, recordkeeping and reporting (§60.5410(c), §60.5415(c), §60.5420(b)(1) and §60.5420(b)(4)).

This rule does not apply to the produced water storage vessel (tank) because the tank does not have the potential to emit VOC ≥ 6 tpy (§60.5420).

This rule does not apply to the group of all equipment, except compressors, within a process unit (§60.5365(f)).

This rule does not apply to the pneumatic controllers because their bleed rate is < 6 scfh, located between the wellhead and point of custody transfer, and not located at a natural gas processing plant (§60.5365(d)(i)).

**11. NESHAP A, General Provisions (aka MACT)**

40CFR§63.1-§63.16

[Applicable]

This rule does apply to all sources subject to an NESHAP. Requirements include notification, monitoring, and recordkeeping.

**12. NESHAP HH, Oil and Natural Gas Production Facilities**

40CFR§63.760-§63.779

[Applicable]

This rule does apply to the triethylene glycol (TEG) dehydrators. However, because each TEG dehydrator will have an actual annual average flowrate of natural gas < 3 MMscfd or actual annual average benzene emissions < 0.9 megagrams per year, they are exempt from all requirements except to maintain records of actual annual average flowrate of natural gas or actual annual average benzene emissions (as appropriate) to demonstrate continuing exemption status (§63.764(e)(1)).

This rule does not apply to storage vessels (tanks), compressors, or ancillary equipment because the facility is an area source of HAP emissions (§63.760(b)(2)). In no case does this rule apply to engines or turbines.

**13. NESHAP HHH, Natural Gas Transmission and Storage Facilities**

40CFR§63.1270-§63.1289

[Not Applicable]

This rule does not apply because the facility is not a natural gas transmission or storage facility transporting or storing natural gas prior to local distribution (§63.1270(a)).

**14. NESHAP YYYY, Stationary Combustion Turbines**

40CFR§63.6080-§63.6175

[Not Applicable]

This rule does not apply as the facility is not a major HAP source (§63.6085).

**15. NESHAP ZZZZ, Stationary Reciprocating Internal Combustion Engines (RICE)**

40CFR§63.6580-§63.6675

[Applicable]

This rule does apply to the Caterpillar G3516B compressor engines and Caterpillar G3306B TA engine; however, because each engine is “new”; i.e., commenced construction or reconstruction on or after 06/12/06 (§63.6590(a)(2)(iii)), the only requirement is compliance with 40CFR§60.4230-§60.4248 (NSPS JJJJ) for Spark Ignition Internal Combustion Engines.

**16. NESHAP DDDDD, Industrial, Commercial, and Institutional Boilers and Process Heaters – Major Sources**

40CFR§63.7480-§63.7575

[Not Applicable]

This rule does not apply as the facility is not a major HAP source (§63.7485).

**17. NESHAP JJJJJJ, Industrial, Commercial, and Institutional Boilers – Area Sources**

40CFR§63.11193-§63.11237

[Not Applicable]

This rule does not apply as there are no industrial, commercial or institutional boilers at the facility. §63.11237 defines a “boiler” as an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water. There are no “boilers” as defined in NESHAP JJJJJJ at the facility.

## 18. Chemical Accident Prevention Provisions

40CFR§68.1-§68.220

[Not Applicable]

This rule does not apply because the facility does not store more than a threshold quantity of a regulated substance in a process, as determined under § 68.115.

## 19. Compliance Assurance Monitoring (CAM)

40CFR§64.1-§64.10

[Not Applicable]

This rule does not apply because the facility is not major source that is required to obtain a part 70 or 71 (Title V) permit.

## 20. Mandatory Greenhouse Gases (GHG) Reporting

40CFR§98.1-§98.9

[Not Applicable]

This rule does not apply. The facility does not have the potential to emit  $\geq 25,000$  metric ton/yr (27,558 tpy) of CO<sub>2</sub>e/yr from all stationary fuel combustion sources combined (§98.2(a)).

### C. Applicability of Source Aggregation

For New Source Review (NSR) and Title V permitting, the three-part regulatory criteria to determine whether emissions from two or more facilities should be aggregated and treated as a single source is whether the activities:

- i) Belong to the same industrial grouping; and
- ii) Are located on one or more contiguous or adjacent properties; and
- iii) Are under control of the same person (or persons under common control).

#### i) Same Industrial Grouping

The subject facility shares the same two-digit major SIC code of 13 as the upstream gas production wells and other Williams' facilities.

#### ii) Contiguous or Adjacent

The determination of whether two or more facilities are "contiguous" or "adjacent" is made on a case-by-case basis. This determination is proximity based, and it is important to focus on this criterion and whether two contiguous or adjacent facilities, considered as a single source, meet the common sense notion of a plant. The functional interrelationship of the two or more facilities is not a relevant inquiry in determining whether the facilities are "contiguous" or "adjacent."

Neither West Virginia nor federal regulations define the terms "contiguous" or "adjacent." It is clear, however, that the determination of whether two or more facilities are "contiguous" or "adjacent" is based on the plain meaning of the terms "adjacent" and "contiguous", which consider the physical distance between the facilities. The term contiguous is defined in the dictionary as being in actual contact; touching along a boundary or at a point. The term adjacent" is defined in the dictionary as not distant, nearby, having a common endpoint or border.

The closest Williams-owned facility to the Conner Compressor Station is the Oak Grove Gas Plant, which is located 2.9 miles away. The Oak Grove Gas Plant does not meet the common sense definition of being "contiguous" with or "adjacent" to the Conner Compressor Station.

The Conner Compressor Station compresses and dehydrates gas produced from upstream production wells located in northern West Virginia. The subject facility is located on a parcel that is adjacent to pre-existing upstream production wellpads operated by Chevron and Consol-Noble and is located less than ½ mile from those wellpads.

The location of the subject facility was chosen because of suitable characteristics for construction and operation, such as the availability of a reasonably flat grade and accessibility for large trucks and equipment. Williams' business model is to construct scalable capacity that contemplates additional production from multiple operators and the initial configuration is merely a foundation for additional opportunities in the area. The subject facility does not need to be located in the immediate vicinity of the upstream wells in order to operate properly. Had suitable land been available elsewhere, the subject facility could have been located farther from the upstream wells and could theoretically be moved farther from the wells without affecting operations. Therefore, despite the fact that the subject facility is located in close proximity to one or many upstream production sources, aggregation of the subject facility with upstream wells does not meet the common sense notion of a plant.

### **iii) Common Control**

Williams OVM operates under its parent company The Williams Companies, Inc. (Williams) and is the sole operator of the subject facility. The closest Williams-operated facility to the subject facility is the Oak Grove Gas Plant, located approximately 2.9 miles away. This facility is the closest to Conner to have common ownership but it is not "contiguous" with or "adjacent" to the Conner facility.

The production wells, including the Chevron and Consol-Noble wellpads, that send natural gas to the subject facility are owned and operated by other companies, which are unaffiliated with Williams. Williams has no ownership stake in the Chevron or Consol-Noble wellpads or in any production well or company in West Virginia that may send natural gas to the subject facility.

Furthermore, neither Williams OVM, nor Williams, exercise operational control over any equipment owned or operated by any natural gas producer upstream of the subject facility. All employees at the subject facility are under the exclusive direction of Williams and are not under the control of any other entity. Similarly, Williams has no authority over employees of the production wells. These companies operate wholly independent of one another. No employees are expected to shuttle back and forth between the subject facility and any production well.

At this time, contracts are in place for the subject facility to process natural gas produced from multiple upstream production wells located throughout the region. As future commercial opportunities are identified, the subject facility will potentially receive gas from other producers. Williams will not have ownership or control of any future wellhead facilities. The producers are, and will be responsible for, any decisions to produce or shut-in wellhead facilities and have no control over the equipment installed, owned, and operated by Williams. Similarly, Williams cannot control the installation or operation of any equipment located at a well site that may be considered an air contamination source.

For the reason above, it is clear that Williams does not have common control of any production wells including the Chevron and Consol-Noble wells.

## **Summary**

The subject facility and the upstream production wells should not be aggregated and treated as a single source of emissions because the subject facility is not under common control with any of the upstream wells. Additionally, the subject facility and the upstream production wells, considered together, do not meet the common sense notion of a plant because the subject facility is expected to service multiple production wells and because the location of the facility was selected for reasons unrelated to the location of the production wells. Accordingly, the subject facility should not be aggregated with the upstream wells in determining major source or PSD status.

### **D. Applicability of State Regulations**

The following State regulations are potentially applicable to natural gas production facilities. Applicability to the facility has been determined as follows:

#### **1. Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers**

45CSR2

[Applicable]

The rule does apply as the heaters and dehydrator reboilers have been determined to meet the definition of a “fuel burning unit” under 45CSR2 and are, therefore, subject to the applicable requirements therein. Specifically pursuant to 45CSR2, Section 3.1, each heater and dehydrator reboiler is subject to an opacity limit of 10% based on a six minute block average. Proper operation and maintenance of each unit (and use of natural gas as fuel) will keep the opacity of the units well below 10% during normal operations.

As none of the heaters have a maximum design heat input rating  $\geq 10$  MMBtu/hr, Sections 4 (emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions) are not applicable.

#### **2. Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors**

45CSR4

[Applicable]

The rule does apply and states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.



- 3. Control of Air Pollution from Combustion of Refuse**  
45CSR6 [Not Applicable]
- The rule does not apply as 45CSR6 establishes emission standards for particulate matter and requirements for activities involving incineration of refuse. There is no incineration of refuse conducted at site. Notwithstanding the above, it should be noted that the particulate matter and opacity standards of 45CSR6 are met through the combustion of clean burning methane/ethane.
- 4. Prevent and Control Air Pollution from the Emission of Sulfur Oxides**  
45CSR10 [Not Applicable]
- This rule does not apply to any of the heaters because the Maximum Design Heat Input (MDHI) rating of each heater is < 10 MMBtu/hr.
- 5. 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**  
45CSR13 [Applicable]
- The rule does apply as Williams OVM is seeking a NSR Modification Permit for the facility. Williams OVM has published the required Class I legal advertisement notifying the public of their permit application, and paid the appropriate application fee.
- 6. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants**  
45CSR14 [Not Applicable]
- The rule does not apply because the facility is not a major source of pollutants subject to Prevention of Significant Deterioration (PSD) rules.
- 7. Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60**  
45CSR16 [Applicable]
- The rule does apply to this source by reference of §40CFR60 Subparts JJJJ and OOOO. Williams OVM is subject to the notification, testing, monitoring, recordkeeping and reporting requirements of these Subparts.
- 8. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment**  
45CSR19 [Not Applicable]
- The rule does not apply. Facility-wide emissions are below the nonattainment New Source Review thresholds of 100 TPY NO<sub>x</sub> and PM<sub>2.5</sub> emissions.
- 9. Regulation of Volatile Organic Compounds (VOC)**  
45CSR21 [Not Applicable]
- This rule does not apply because the facility is not located in Putnam County, Kanawha County, Cabell County, Wayne County, or Wood County

**10. Air Quality Management Fees Program**

45CSR22

[Applicable]

This rule does apply. It establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution.

**11. Prevent and Control Emissions of Toxic Air Pollutants**

45CSR27

[Not Applicable]

This rule does not apply because equipment is used in the production and distribution of petroleum products is exempt, provided that the product contains no more than 5% benzene by weight (§45-22-2.4).

**12. Air Pollution Emissions Banking and Trading**

45CSR28

[Not Applicable]

This rule does not apply. The facility does not choose to participate in the voluntarily statewide air pollutant emissions trading program.

**13. Emission Statements for VOC and NOX**

45CSR29

[Not Applicable]

This rule does not apply because facility is not located in Putnam, Kanawha, Cabell, Wayne, Wood, or Greenbrier Counties (§45-29-1).

**14. Requirements for Operating Permits**

45CSR30

[Not Applicable]

This rule does not apply as the facility is a minor (or “deferred”) source of all regulated pollutants.

**15. Emission Standards for Hazardous Air Pollutants (HAP)**

45CSR34

[Not Applicable]

This rule does not apply because the provisions under Subparts HH and ZZZZ of 40 CFR Part 63 which apply to non-major area sources of hazardous air pollutants are excluded.

## ATTACHMENT E

### Plot Plan

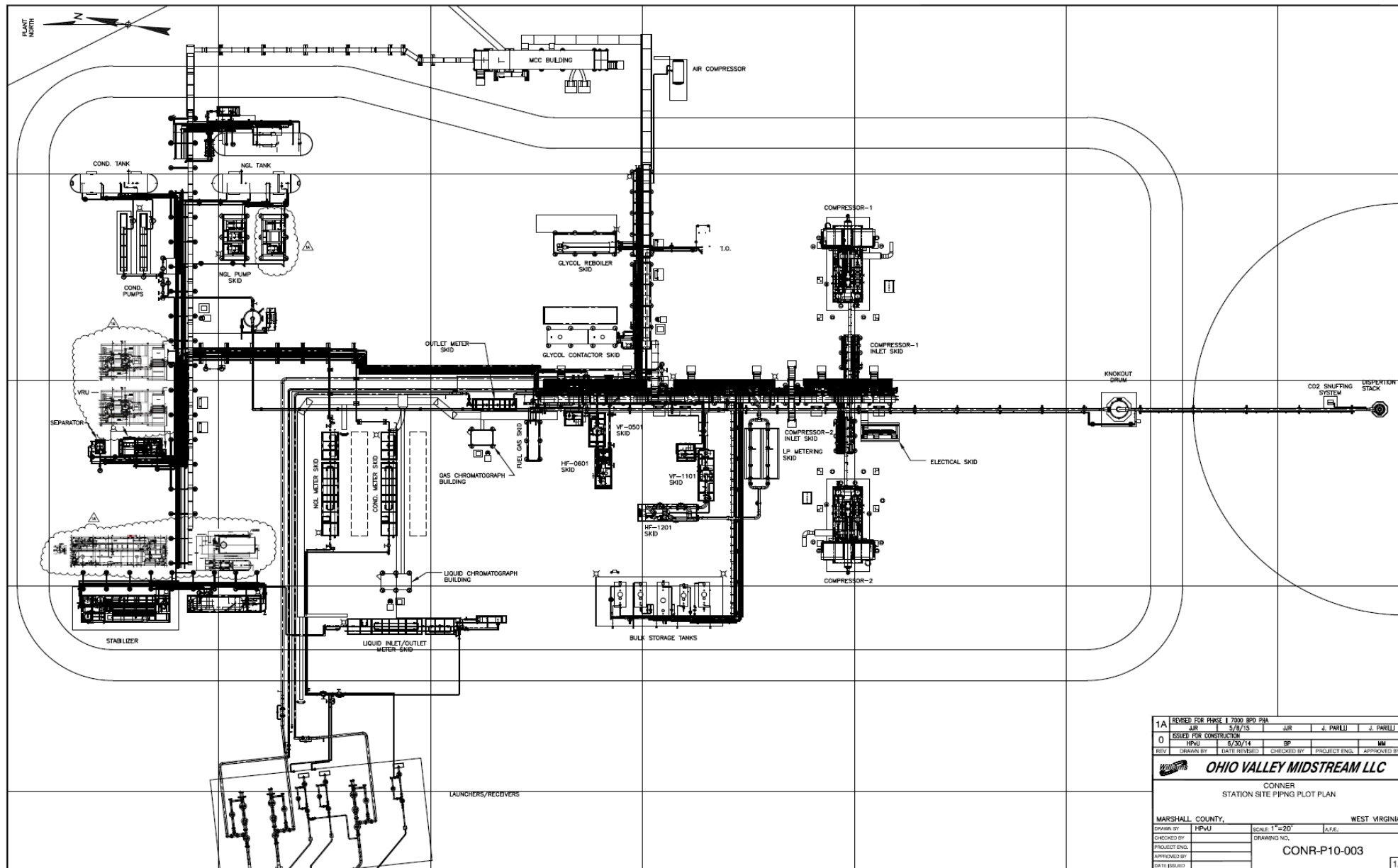
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“21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E.”

- 
- Plot Plan – OVM Conner CS
-

Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit

**Attachment E - Plot Plan**



1A	REVISED FOR PHASE I 7000 BPD PRA	JR	J. PARELLI	J. PARELLI
0	ISSUED FOR CONSTRUCTION	JR	J. PARELLI	J. PARELLI
REV	HPVJ	6/30/14	BP	MM
	DRAWN BY	DATE REVISION	CHECKED BY	PROJECT ENG.
				APPROVED BY
<b>OHIO VALLEY MIDSTREAM LLC</b>				
CONNER STATION SITE PIPING PLOT PLAN				
MARSHALL COUNTY,		SCALE: 1"=20'		WEST VIRGINIA
DRAWN BY	HPVJ	DRAWING NO.	CONR-P10-003	
CHECKED BY		DATE PERIOD		
PROJECT ENG.				
APPROVED BY				
			1A	

**ATTACHMENT F**  
**Detailed Process Flow Diagram**

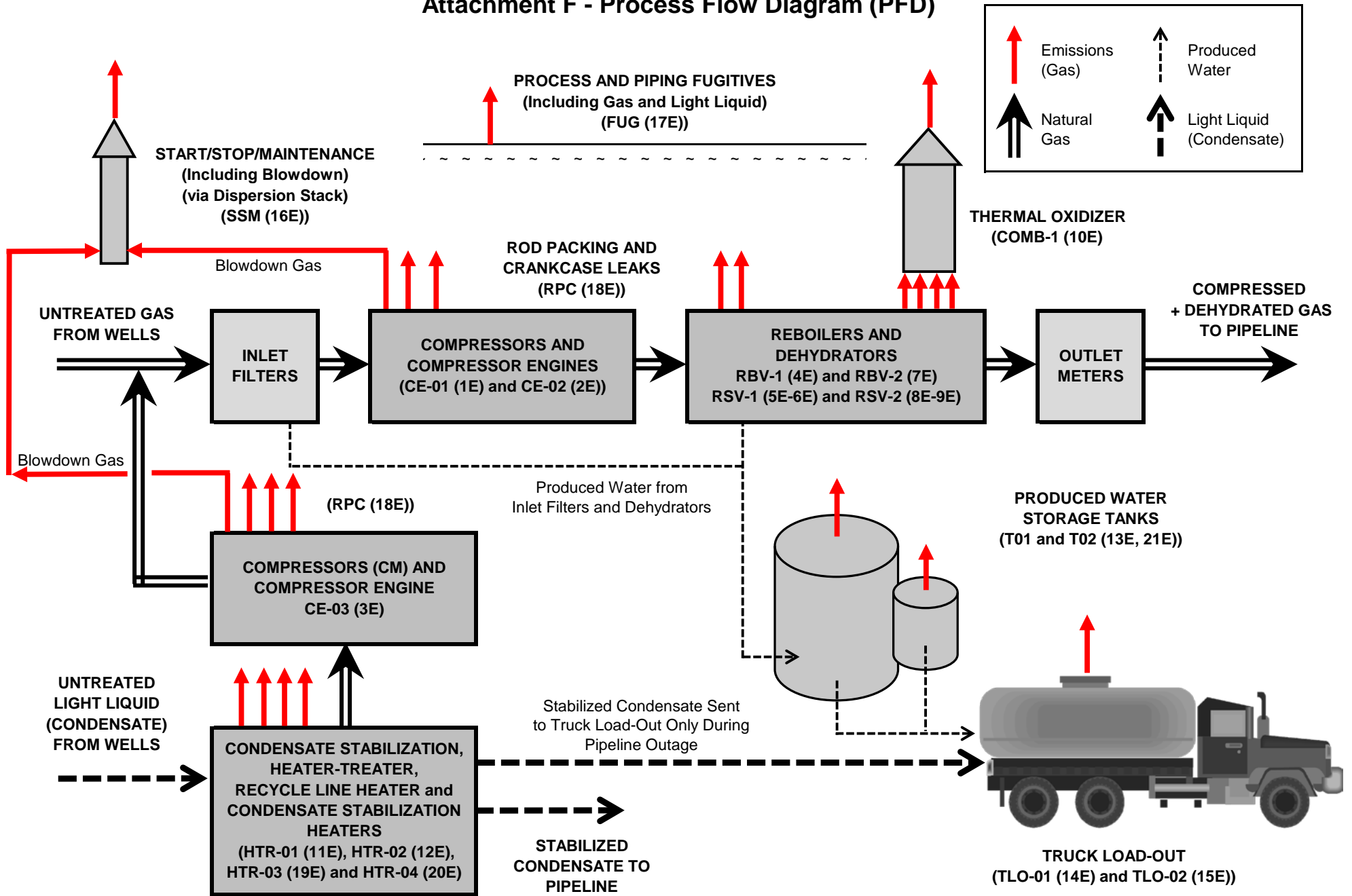
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“22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as Attachment F.”

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- Process Flow Diagram (PFD) – OVM Conner CS
-

**Attachment F - Process Flow Diagram (PFD)**



## **ATTACHMENT G**

### **Process Description**

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“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). “

---

- **Process Description**
    - A. Project Overview
    - B. Compressor Engines
    - C. Compressor Rod Packing and Crankcase Leaks
    - D. Startup/Shutdown/Maintenance
    - E. Triethylene Glycol (TEG) Dehydrators
    - F. Triethylene Glycol (TEG) Reboilers
    - G. Thermal Oxidizer
    - H. Heaters
    - I. Storage Tanks
    - J. Truck Load-Out
    - K. Piping and Equipment Fugitive Emissions
-

Williams Ohio Valley Midstream LLC  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 Modification Permit

**Attachment G**  
**PROCESS DESCRIPTION**

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the existing Conner Compressor Station located east of Roberts Ridge Road, approximately 2.3 miles south-southwest of Moundsville (See Appendix B – Site Location Map). The facility receives natural gas from local production wells then compresses and dehydrates the gas for delivery to a gathering pipeline. Additionally, raw field condensate is received at the site, stabilized and then sent offsite via pipeline.

B. Reciprocating Engines

Three (3) natural gas-fueled reciprocating engines are utilized at the facility. These engines drive a natural gas compressor to increase the pressure of the natural gas. Emissions result from the combustion of natural gas fuel.

C. Compressor Rod Packing and Crankcase Emissions

The compressor and engine operations result in emissions from the wear of mechanical joints, seals, and rotating surfaces over time.

D. Startup/Shutdown/Maintenance

During routine operation of the facility, the compressor engine will undergo periods of startup and shutdown. Often when the engine is shutdown, the natural gas contained within the compressor and associated piping is vented to atmosphere. Additionally, there will be other infrequent and (often) de-minimis emissions from various maintenance activities at the facility that are not necessarily associated with compressor blowdowns.

The SSM emissions are generally vented through a dispersion stack.

E. Tri-Ethylene Glycol (TEG) Dehydrators

Two (2) Triethylene Glycol (TEG) Dehydrators are utilized at the facility. Each dehydrator is comprised of a Contactor/Absorber Tower (no vented emissions), a Flash Tank, and a Regenerator/Still Vent.

The TEG Dehydrators are used to remove water vapor from the inlet wet gas stream to meet pipeline specifications. In the dehydration process, the wet inlet gas stream flows through a contactor tower where the gas is contacted with lean glycol. The lean glycol absorbs the water in the gas stream and becomes rich glycol laden with water and trace amounts of hydrocarbons.

The rich glycol is then routed to a flash tank where the glycol pressure is reduced to liberate the lighter end hydrocarbons (especially methane). Whenever practical, the lighter end



hydrocarbons are routed from the flash tank to the Reboiler for use as fuel; otherwise these off-gases are vented to a thermal oxidizer.

The rich glycol is then sent from the flash tank to the regenerator/still where the TEG is heated to drive off the water vapor and any remaining hydrocarbons. The off-gases from the regenerator/still are vented to a thermal oxidizer.

Once boiled, the glycol is returned to a lean state and used again in the process.

F. Tri-Ethylene Glycol (TEG) Reboilers

Tri-Ethylene Glycol (TEG) Reboilers are utilized to supply heat for the Triethylene Glycol (TEG) Regenerator/Stills.

G. Thermal Oxidizer

One 6.4 MMBtu/hr thermal oxidizer (COMB-1) with 99% VOC/HAPs destruction efficiency is used to control the dehydrator's flash gas and still vent vapor streams.

H. Heaters

One (1) 1.55 MMBtu/hr heater-treater (HTR-01), one (1) 2.55 MMBtu/hr condensate stabilizer heater (HTR-02), One (1) 1.66 MMBtu/hr station recycle line heater (HTR-03), and one (1) 9.7 MMBtu/hr condensate stabilizer heater (HTR-04) will be used at the site.

I. Storage Tanks

There are tanks at the facility used to store various materials, including produced water, lube oil, fresh and spent TEG, etc. All of these tanks, except for the produced water storage tanks, generate de-minimis (insignificant) emissions.

The produced water tanks receive liquids from the dehydrator and inlet separator. Liquids removed through the dehydration process are cooled, condensed and sent to the atmospheric storage tanks (T01 and T02).

A ProMax simulation of was completed to determine the presence of flash emissions from the storage tanks. The ProMax process simulation showed minimal tank flash emissions and these losses are included in the emission estimates.

J. Truck Load-Out

Produced water will be loaded into tanker trucks (TLO-01) and produce small quantities of VOC emissions. Additionally, under normal operating conditions, stabilized condensate will be sent offsite via pipeline; however, during unforeseen periods of pipeline outage, the stabilized condensate will be offloaded into tanker trucks (TLO-02), which will also create VOC emissions.

K. Piping and Equipment Fugitive Emissions

Piping and process equipment generate from leaks from different component types (connectors, valves, pumps, etc.) in gas-vapor service and light-liquid (condensate) service.

**ATTACHMENT H**  
**Material Safety Data Sheets (MSDS)**  
**(And Representative Gas Analysis)**

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“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.”

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- **NATURAL GAS**
    - Extended Gas Analysis
    - Composition Summary
  
  - **CONDENSATE**
    - Extended Liquids Analysis
    - Composition Summary
  
  - **MATERIAL SAFETY DATA SHEETS (MSDS):**
    - Wellhead Natural Gas
    - Natural Gas Condensate (Light Liquid)
    - Produced Water
    - Triethylene Glycol (TEG)
-

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment H - Gas Analysis**

**Inlet Natural Gas - Certificate of Analysis**



**HOUSTON LABORATORIES**  
 8820 INTERCHANGE DRIVE  
 HOUSTON, TEXAS 77054  
 PHONE (713) 680-0901

**CERTIFICATE OF ANALYSIS**

Number : 2009090563-001A

Gas Analytical Services  
 Chuck Honaker  
 PO Box 1028  
 Bridgeport, West Virginia 26330

Field:	Chief Oil & Gas	Report Date:	10/01/09
Station:	Cavenay #1-H	Sample Of:	Spot - Gas
Station No.:		Sample Date:	09/23/2009 14:35
Sample Point:	Flowback's (Manek's)	Sample Conditions:	165 psi ,N.G.° F
Cylinder # :		PO / Ref. No.:	
Comments:	3 Phase Sep.		

**ANALYTICAL DATA**

Components	Mol %	Wt%	GPM at 14,696 psia	Method	Lab Tech. Analyzed	Date
				GPA-2286 (MC14)	JL	10/01/09
Nitrogen	0.465	0.578	0.051			
Methane	71.426	50.915	12.078			
Carbon Dioxide	0.188	0.369	0.032			
Ethane	17.027	22.752	4.542			
Propane	6.819	13.362	1.874			
iso Butane	0.722	1.866	0.236			
n-Butane	1.974	5.097	0.621			
iso Pentane	0.366	1.173	0.134			
n-Pentane	0.503	1.613	0.182			
i-Hexanes	0.089	0.342	0.036			
n-Hexane	0.102	0.373	0.040			
Benzene	0.002	0.006	NIL			
Cyclohexane	0.014	0.052	0.005			
i-Heptanes	0.082	0.367	0.037			
n-Heptane	0.054	0.247	0.025			
Toluene	0.006	0.024	0.002			
i-Octanes	0.083	0.411	0.039			
n-Octane	0.021	0.108	0.011			
*e-Benzene	0.001	0.004	NIL			
*m,o,&p-Xylene	0.007	0.035	0.003			
i-Nonanes	0.029	0.165	0.016			
n-Nonane	0.007	0.040	0.004			
i-Decanes	0.011	0.085	0.008			
n-Decane	0.002	0.012	0.001			
Undecanes	NIL	0.004	NIL			
Dodecanes	NIL	NIL	NIL			
Tridecanes	NIL	NIL	NIL			
Tetradecanes Plus	NIL	NIL	NIL			
<b>Totals</b>	<b>100.000</b>	<b>100.000</b>	<b>19.977</b>			
<b>Calculated Values</b>						
	<b>TOTAL</b>	<b>C6+</b>	<b>C7+</b>			
Molecular Weight	22.504	100.402	108.752			
Real Dry BTU @ 14,696 psia, 60 °F	1350.1	5374.0	5742.7			
Real Wet BTU @ 14,696 psia, 60 °F	1327.4	5281.1	5643.4			
Relative Density	0.7795	3.4180	3.6782			
	<b>TOTAL</b>	<b>C2+</b>	<b>iC5+</b>			
GPM's at 14,696 psia, 60 °F	19.977	7.816	0.543			
Compressibility Factor	0.9953					

*As Staley*

Hydrocarbon Laboratory Manager

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment H - Gas Analysis**

**Condensate - Certificate of Analysis**



**Certificate of Analysis**  
 Number: 1030-15040195-001A

**Houston Laboratories**  
 8820 Interchange Drive  
 Houston, TX 77054  
 Phone 713-660-0901

Stephanie Poch  
 Williams  
 200 Caiman Dr.  
 Moundsville, WV 26041

Apr. 24, 2015

Station Name: Conner Berger CRP  
 Method: GPA 2103M  
 Cylinder No: 89304  
 Analyzed: 04/07/2015 10:08:43 by RR

Sampled By:  
 Sample Of: Liquid Spot  
 Sample Date: 03/30/2015 11:00  
 Sample Conditions: 485 psig, @ 68 °F

**Analytical Data**

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	0.016	28.013	0.005	0.807	0.004
Methane	1.781	16.043	0.314	0.300	0.705
Carbon Dioxide	0.017	44.010	0.008	0.817	0.007
Ethane	7.225	30.069	2.388	0.356	4.521
Propane	12.264	44.096	5.945	0.507	7.907
Iso-Butane	2.850	58.122	1.821	0.563	2.183
n-Butane	11.713	58.122	7.483	0.584	8.641
Iso-Pentane	4.445	72.149	3.525	0.625	3.804
n-Pentane	7.949	72.149	6.304	0.631	6.743
i-Hexanes	3.624	85.500	3.405	0.666	3.449
n-Hexane	5.475	86.175	5.186	0.664	5.268
2,2,4-Trimethylpentane	0.018	114.231	0.023	0.697	0.022
Benzene	0.090	78.114	0.077	0.885	0.059
Heptanes	11.210	97.961	12.072	0.700	11.631
Toluene	0.504	92.141	0.510	0.872	0.394
Octanes	10.780	110.540	13.099	0.727	12.159
Ethylbenzene	0.076	106.167	0.089	0.872	0.069
Xylenes	0.609	106.167	0.710	0.872	0.550
Nonanes	6.539	126.989	9.127	0.741	8.314
Decanes Plus	12.815	198.141	27.909	0.799	23.570
	100.000		100.000		100.000

Physical Properties	Total	C10+
Specific Gravity at 60°F	0.6746	0.7988
API Gravity at 60°F	78.258	45.641
Molecular Weight	90.976	198.141
Pounds per Gallon (in Vacuum)	5.624	6.660
Pounds per Gallon (in Air)	5.618	6.652
Cu. Ft. Vapor per Gallon @ 14.696 psia	23.460	12.755

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment H - Gas Analysis**

**Extended Gas Analysis Summary**

Gas Analysis for Caveney #1-H - Sampled 09/23/09

Compound	CAS	Formula	Molecular Weight (MW)	Mole % (M% = V%)	Mole Fraction (M%/Sum-M%)	Weighted Sum (MW*MF)	Weight % (WS/Sum-WS)	lb/MMscf (WS/UGC#)
Water	109-86-4	H2O	18.02	---	---	---	---	---
Carbon Monoxide	630-08-0	CO	28.01	---	---	---	---	---
Nitrogen	7727-37-9	N2	28.01	<b>0.4650</b>	0.00465	0.1303	0.5788	<b>343.26</b>
Oxygen	7782-44-7	O2	32.00	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.09	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.01	<b>0.1880</b>	0.00188	0.0827	0.3676	<b>218.03</b>
Methane*	75-82-8	CH4	16.04	<b>71.4260</b>	0.71426	11.4584	50.9111	<b>30,194.92</b>
Ethane*	74-84-0	C2H6	30.07	<b>17.0270</b>	0.17027	5.1198	22.7480	<b>13,491.63</b>
Propane**	74-98-6	C3H8	44.10	<b>6.8190</b>	0.06819	3.0069	13.3598	<b>7,923.60</b>
i-Butane**	75-28-5	C4H10	58.12	<b>0.7220</b>	0.00722	0.4196	1.8645	<b>1,105.82</b>
n-Butane**	106-97-8	C4H10	58.12	<b>1.9740</b>	0.019740	1.1473	5.0977	<b>3,023.40</b>
Cyclopentane**	287-92-3	C5H10	70.10	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.15	<b>0.3660</b>	0.003660	0.2641	1.1733	<b>695.85</b>
n-Pentane**	109-66-0	C5H12	72.15	<b>0.5030</b>	0.005030	0.3629	1.6124	<b>956.32</b>
Cyclohexane**	110-82-7	C6H12	84.16	<b>0.0140</b>	0.000140	0.0118	0.0523	<b>31.05</b>
Other Hexanes**	110-54-3	C6H14	86.18	<b>0.0890</b>	0.000890	0.0767	0.3408	<b>202.11</b>
Methylcyclohexanes**	varies	C7H14	98.19	---	---	---	---	---
Heptanes**	varies	C7H16	100.20	<b>0.1360</b>	0.001360	0.1363	0.6055	<b>359.11</b>
C8+ Heavies**	varies	C8+	130.00 est	<b>0.0705</b>	0.000705	0.0916	0.4072	<b>241.51</b>
Benzene***	71-43-2	C6H6	78.11	<b>0.0020</b>	0.000020	0.0016	0.0069	<b>4.12</b>
Ethylbenzene***	100-41-4	C8H10	106.17	<b>0.0010</b>	0.000010	0.0011	0.0047	<b>2.80</b>
n-Hexane***	110-54-3	C6H14	86.18	<b>0.1020</b>	0.001020	0.0879	0.3905	<b>231.63</b>
Toluene***	108-88-3	C7H8	92.14	<b>0.0060</b>	0.000060	0.0055	0.0246	<b>14.57</b>
2,2,4-Trimethylpentane**	540-84-1	C8H18	114.23	<b>0.0830</b>	0.000830	0.0948	0.4212	<b>249.84</b>
Xylenes***	1330-20-7	C8H10	106.17	<b>0.0070</b>	0.000070	0.0074	0.0330	<b>19.58</b>

<b>Total:</b>	<b>100.00</b>	<b>1.0000</b>	<b>22.51</b>	<b>100.00</b>	<b>59,309</b>
<b>THC:</b>	<b>99.35</b>	<b>0.9935</b>	<b>22.29</b>	<b>99.05</b>	<b>58,748</b>
<b>Total CH4:</b>	<b>71.43</b>	<b>0.7143</b>	<b>11.46</b>	<b>50.91</b>	<b>30,195</b>
<b>Total VOC:</b>	<b>10.89</b>	<b>0.1089</b>	<b>5.72</b>	<b>25.39</b>	<b>15,061</b>
<b>Total HAP:</b>	<b>0.20</b>	<b>0.0020</b>	<b>0.20</b>	<b>0.88</b>	<b>523</b>

\* = Hydrocarbon (HC)      \*\* = also Volatile Organic Compound (EPA-VOC)      \*\*\* = also Hazardous Air Pollutant (EPA-HAP)  
 #UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 °F and 14.696 psia.      Pound "X"/scf = M% of "X" \* MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Compound	CAS	Formula	Representative Gas Analysis			Assumed "Worst-Case" Assumption (120%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.1880	0.3676	218.03	0.226	0.441	261.63
Methane*	75-82-8	CH4	71.4260	50.9111	30,194.92	100.000	100.000	42,275.00
Ethane*	74-98-6	C2H6	6.8190	13.3598	7,923.60	8.183	16.032	9,508.33
VOC**	Various	C3 thru C10+	10.8945	25.3946	15,061.31	13.073	30.473	18,073.57
Benzene***	71-43-2	C6H6	0.0020	0.0069	4.12	0.0024	0.008	4.94
Ethylbenzene***	100-41-4	C8H10	0.0010	0.0047	2.80	0.0012	0.006	3.36
n-Hexane***	110-54-3	C6H14	0.1020	0.3905	231.63	0.1224	0.469	277.95
Toluene***	108-88-3	C7H8	0.0060	0.0246	14.57	0.0072	0.029	17.48
2,2,4-Trimethylpentane**	540-84-1	C8H18	0.0830	0.4212	249.84	0.0996	0.505	299.81
Xylenes***	1330-20-7	C8H10	0.0070	0.0330	19.58	0.0084	0.040	23.50
Total HAP***	Various	C6 thru C8	0.2010	0.8810	522.53	0.2412	1.057	627.04



Ingenuity takes energy.

# Wellhead Natural Gas

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision Date: 10/02/2013

Version: 1.0

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

#### Product Identifier

**Product Form:** Mixture

**Product Name:** Wellhead Natural Gas

**Synonyms:** Wellhead Gas, Raw Gas, Methane, Residue Gas, Natural Gas Sweet, Marsh Gas, Fuel Gas, Petroleum Gas.

#### Intended Use of the Product

**Use of the Substance/Mixture:** Fuel.

#### Name, Address, and Telephone of the Responsible Party

##### Company

Williams, Inc.

One Williams Center

Tulsa, OK 74172, US

T 800-688-7507

[enterpriseehs@williams.com](mailto:enterpriseehs@williams.com)

#### Emergency Telephone Number

**Emergency number** : 800-424-9300

### SECTION 2: HAZARDS IDENTIFICATION

#### Classification of the Substance or Mixture

##### Classification (GHS-US)

Simple Asphy

Flam. Gas 1 H220

Compressed gas H280

#### Label Elements

##### GHS-US Labeling

##### Hazard Pictograms (GHS-US)



##### Signal Word (GHS-US)

: Danger

##### Hazard Statements (GHS-US)

: H220 - Extremely flammable gas  
H280 - Contains gas under pressure; may explode if heated  
May displace oxygen and cause rapid suffocation

##### Precautionary Statements (GHS-US)

: P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381 - Eliminate all ignition sources if safe to do so.  
P403 - Store in a well-ventilated place.  
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

#### Other Hazards

**Other Hazards Not Contributing to the Classification:** Contains hydrogen sulfide. Hydrogen sulfide is a highly flammable, explosive gas under certain conditions, is a toxic gas, and may be fatal. Gas can accumulate in the headspace of closed containers, use caution when opening sealed containers. Heating the product or containers can cause thermal decomposition of the product and release hydrogen sulfide. Exposure may aggravate those with pre existing eye, skin, or respiratory conditions.

**Unknown Acute Toxicity (GHS-US)** Not available

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### Mixture

Name	Product identifier	% (w/w)	Classification (GHS-US)
Methane	(CAS No) 74-82-8	> 75	Simple Asphy

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment H - Gas Analysis**

**Condensate Analysis Summary**

Sampled 02/27/15

Compound	CAS	Formula	Molecular Weight (MW)	Mole % (M% = V%)	Mole Fraction (M%/Sum-M%)	Weighted Sum (MW*MF)	Weight % (WS/Sum-WS)	lb/MMscf (WS/UGC#)
Water	109-86-4	H2O	18.02	---	---	---	---	---
Carbon Monoxide	630-08-0	CO	28.01	---	---	---	---	---
Nitrogen	7727-37-9	N2	28.01	<b>0.0160</b>	0.00016	0.0045	0.0053	<b>11.81</b>
Oxygen	7782-44-7	O2	32.00	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.09	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.01	<b>0.0170</b>	0.00017	0.0075	0.0088	<b>19.72</b>
Methane*	75-82-8	CH4	16.04	<b>1.7810</b>	0.01781	0.2857	0.3369	<b>752.91</b>
Ethane*	74-84-0	C2H6	30.07	<b>7.2250</b>	0.07225	2.1725	2.5614	<b>5,724.88</b>
Propane**	74-98-6	C3H8	44.10	<b>12.2640</b>	0.12264	5.4079	6.3761	<b>14,250.71</b>
i-Butane**	75-28-5	C4H10	58.12	<b>2.8500</b>	0.02850	1.6565	1.9531	<b>4,365.12</b>
n-Butane**	106-97-8	C4H10	58.12	<b>11.7130</b>	0.117130	6.8079	8.0267	<b>17,939.86</b>
Cyclopentane**	287-92-3	C5H10	70.10	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.15	<b>4.4450</b>	0.044450	3.2070	3.7812	<b>8,451.03</b>
n-Pentane**	109-66-0	C5H12	72.15	<b>7.9490</b>	0.079490	5.7351	6.7619	<b>15,112.99</b>
Cyclohexane**	110-82-7	C6H12	84.16	---	---	---	---	---
Other Hexanes**	110-54-3	C6H14	86.18	<b>3.6240</b>	0.036240	3.1230	3.6821	<b>8,229.63</b>
Methylcyclohexanes**	varies	C7H14	98.19	---	---	---	---	---
Heptanes**	varies	C7H16	100.20	<b>11.2100</b>	0.112100	11.2326	13.2437	<b>29,599.92</b>
C8+ Heavies**	varies	C8+	130.00 est	<b>30.1340</b>	0.301340	39.1742	46.1879	<b>103,230.72</b>
Benzene***	71-43-2	C6H6	78.11	<b>0.0900</b>	0.000900	0.0703	0.0829	<b>185.25</b>
Ethylbenzene***	100-41-4	C8H10	106.17	<b>0.0760</b>	0.000760	0.0807	0.0951	<b>212.62</b>
n-Hexane***	110-54-3	C6H14	86.18	<b>5.4750</b>	0.054750	4.7181	5.5628	<b>12,433.00</b>
Toluene***	108-88-3	C7H8	92.14	<b>0.5040</b>	0.005040	0.4644	0.5475	<b>1,223.71</b>
2,2,4-Trimethylpentane**	540-84-1	C8H18	114.23	<b>0.0180</b>	0.000180	0.0206	0.0242	<b>54.18</b>
Xylenes***	1330-20-7	C8H10	106.17	<b>0.6090</b>	0.006090	0.6465	0.7623	<b>1,703.76</b>

<b>Total:</b>	<b>100.00</b>	<b>1.0000</b>	<b>84.81</b>	<b>100.00</b>	<b>223,502</b>
<b>THC:</b>	<b>99.97</b>	<b>0.9997</b>	<b>84.80</b>	<b>99.99</b>	<b>223,470</b>
<b>Total CH4:</b>	<b>1.78</b>	<b>0.0178</b>	<b>0.29</b>	<b>0.34</b>	<b>753</b>
<b>Total VOC:</b>	<b>90.96</b>	<b>0.9096</b>	<b>82.34</b>	<b>97.09</b>	<b>216,992</b>
<b>Total HAP:</b>	<b>6.77</b>	<b>0.0677</b>	<b>6.00</b>	<b>7.07</b>	<b>15,813</b>

\* = Hydrocarbon (HC)      \*\* = also Volatile Organic Compound (EPA-VOC)      \*\*\* = also Hazardous Air Pollutant (EPA-HAP)  
 #UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 °F and 14.696 psia.      Pound "X"/scf = M% of "X" \* MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Compound	CAS	Formula	Representative Liquid Analysis			Assumed "Worst-Case" Assumption (120%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.0170	0.0088	19.72	0.020	0.011	23.66
Methane*	75-82-8	CH4	1.7810	0.3369	752.91	2.137	0.404	903.49
Ethane*	74-84-0	C2H6	7.2250	2.5614	5,724.88	8.670	3.074	6,869.85
VOC**	Various	C3 thru C10+	90.9610	97.0876	216,992.49	100.000	100.000	260,390.99
Benzene***	71-43-2	C6H6	0.0900	0.0829	185.25	0.1080	0.099	222.31
Ethylbenzene***	100-41-4	C8H10	0.0760	0.0951	212.62	0.0912	0.114	255.14
n-Hexane***	110-54-3	C6H14	5.4750	5.5628	12,433.00	6.5700	6.675	14,919.60
Toluene***	108-88-3	C7H8	0.5040	0.5475	1,223.71	0.6048	0.657	1,468.46
2,2,4-Trimethylpentane**	540-84-1	C8H18	0.0180	0.0242	54.18	0.0216	0.029	65.02
Xylenes***	1330-20-7	C8H10	0.6090	0.7623	1,703.76	0.7308	0.915	2,044.51
Total HAP***	Various	C6 thru C8	6.7720	7.0749	15,812.53	8.1264	8.490	18,975.04

# Wellhead Natural Gas

## Safety Data Sheet

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			Flam. Gas 1, H220 Liquefied gas, H280
Ethane	(CAS No) 74-84-0	< 20	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Propane	(CAS No) 74-98-6	< 10	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Carbon dioxide	(CAS No) 124-38-9	< 10	Simple Asphy Compressed gas, H280
Butane	(CAS No) 106-97-8	< 5	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Nitrogen	(CAS No) 7727-37-9	< 5	Simple Asphy Compressed gas, H280
Hydrogen sulfide	(CAS No) 7783-06-4	<= 0.0004	Flam. Gas 1, H220 Liquefied gas, H280 Acute Tox. 2 (Inhalation:gas), H330 Aquatic Acute 1, H400

Full text of H-phrases: see section 16

## SECTION 4: FIRST AID MEASURES

### Description of First Aid Measures

**General:** Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

**Inhalation:** When symptoms occur: go into open air and ventilate suspected area. Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell

**Skin Contact:** Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists. Thaw frosted parts with lukewarm water. Do not rub affected area.

**Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists

**Ingestion:** Rinse mouth. Do NOT induce vomiting. Get immediate medical attention.

### Most Important Symptoms and Effects Both Acute and Delayed

**General:** May cause frostbite on contact with the liquid. Butane is an asphyxiant. Lack of oxygen can be fatal

**Inhalation:** Gas can be toxic as a simple asphyxiant by displacing oxygen from the air. Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness

**Skin Contact:** Contact with the liquid may cause cold burns/frostbite

**Eye Contact:** This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns

**Ingestion:** Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

**Chronic Symptoms:** Contains a small amount of Hydrogen Sulfide, symptoms of overexposure are headaches, dizziness, nausea, coughing, respiratory irritation, eye irritation, skin irritation, pain in the nose, and loss of consciousness. Heating of the product may release higher amounts of Hydrogen Sulfide (H<sub>2</sub>S).

### Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

## SECTION 5: FIREFIGHTING MEASURES

### Extinguishing Media

**Suitable Extinguishing Media:** Foam, dry chemical, carbon dioxide, water spray, fog

**Unsuitable Extinguishing Media:** Do not use a heavy water stream. Use of heavy stream of water may spread fire



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### **Special Hazards Arising From the Substance or Mixture**

**Fire Hazard:** Extremely flammable gas

**Explosion Hazard:** May form flammable/explosive vapor-air mixture. Heating may cause an explosion. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

**Reactivity:** Hazardous reactions will not occur under normal conditions.

### **Advice for Firefighters**

**Precautionary Measures Fire:** Exercise caution when fighting any chemical fire

**Firefighting Instructions:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leaking gas fire, eliminate all ignition sources if safe to do so. Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Carbon oxides (CO, CO<sub>2</sub>). Hydrocarbon, sulfur dioxide (SO<sub>2</sub>), and Hydrogen sulfide (H<sub>2</sub>S) fatal and irritating gases

**Other information:** Do not allow run-off from fire fighting to enter drains or water courses

### **Reference to Other Sections**

Refer to section 9 for flammability properties.

## **SECTION 6: ACCIDENTAL RELEASE MEASURES**

### **Personal Precautions, Protective Equipment and Emergency Procedures**

**General Measures:** Use special care to avoid static electric charges. Eliminate every possible source of ignition. Keep away from heat/sparks/open flames/hot surfaces - No smoking. Avoid breathing (dust, vapor, mist, gas). Use only outdoors or in a well-ventilated area. Ruptured cylinders may rocket. Do not allow product to spread into the environment

#### **For Non-Emergency Personnel**

**Protective Equipment:** Use appropriate personal protection equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel.

#### **For Emergency Personnel**

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Ventilate area.

### **Environmental Precautions**

Prevent entry to sewers and public waters. Avoid release to the environment

### **Methods and Material for Containment and Cleaning Up**

**For Containment:** Notify authorities if liquid enters sewers or public waters. Use only non-sparking tools

**Methods for Cleaning Up:** Clear up spills immediately and dispose of waste safely. Isolate area until gas has dispersed. Use water spray to disperse vapors. For water based spills contact appropriate authorities and abide by local regulations for hydrocarbon spills into waterways. Contact competent authorities after a spill

### **Reference to Other Sections**

See heading 8, Exposure Controls and Personal Protection.

## **SECTION 7: HANDLING AND STORAGE**

### **Precautions for Safe Handling**

**Additional Hazards When Processed:** Handle empty containers with care because residual vapors are flammable. Extremely flammable gas. Do not pressurize, cut, or weld containers. Do not puncture or incinerate container. Liquid gas can cause frost-type burns. If stored under heat for extended periods or significantly agitated, this material might evolve or release hydrogen sulfide, a toxic, flammable gas, which can raise and widen this material's actual flammability limits and significantly lower its auto-ignition temperature. Hydrogen sulfide can be fatal.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product

**Technical Measures:** Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations.

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**Storage Conditions:** Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep in fireproof place. Store in a well-ventilated place. Keep container tightly closed. Keep/Store away from extremely high or low temperatures, ignition sources, direct sunlight, incompatible materials. Store in original container.

**Incompatible Materials:** strong acids, Strong bases, Strong oxidizers, chlorine, Halogenated compounds

**Conditions for Safe Storage, Including Any Incompatibilities** Not available

### Specific End Use(s)

Fuel.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control Parameters

<b>Hydrogen sulfide (7783-06-4)</b>		
USA ACGIH	ACGIH TWA (ppm)	1 ppm
USA ACGIH	ACGIH STEL (ppm)	5 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm
USA NIOSH	NIOSH REL (ceiling) (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (ceiling) (ppm)	10 ppm
USA IDLH	US IDLH (ppm)	100 ppm
Alberta	OEL Ceiling (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Alberta	OEL Ceiling (ppm)	15 ppm
Alberta	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Alberta	OEL TWA (ppm)	10 ppm
British Columbia	OEL Ceiling (ppm)	10 ppm
Manitoba	OEL STEL (ppm)	5 ppm
Manitoba	OEL TWA (ppm)	1 ppm
New Brunswick	OEL STEL (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
New Brunswick	OEL STEL (ppm)	15 ppm
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
New Brunswick	OEL TWA (ppm)	10 ppm
Newfoundland & Labrador	OEL STEL (ppm)	5 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1 ppm
Nova Scotia	OEL STEL (ppm)	5 ppm
Nova Scotia	OEL TWA (ppm)	1 ppm
Nunavut	OEL Ceiling (mg/m <sup>3</sup> )	28 mg/m <sup>3</sup>
Nunavut	OEL Ceiling (ppm)	20 ppm
Nunavut	OEL STEL (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Nunavut	OEL STEL (ppm)	15 ppm
Nunavut	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL Ceiling (mg/m <sup>3</sup> )	28 mg/m <sup>3</sup>
Northwest Territories	OEL Ceiling (ppm)	20 ppm
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Northwest Territories	OEL STEL (ppm)	15 ppm
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Northwest Territories	OEL TWA (ppm)	10 ppm
Ontario	OEL STEL (ppm)	15 ppm
Ontario	OEL TWA (ppm)	10 ppm
Prince Edward Island	OEL STEL (ppm)	5 ppm
Prince Edward Island	OEL TWA (ppm)	1 ppm
Québec	VECD (mg/m <sup>3</sup> )	21 mg/m <sup>3</sup>
Québec	VECD (ppm)	15 ppm

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Québec	VEMP (mg/m <sup>3</sup> )	14 mg/m <sup>3</sup>
Québec	VEMP (ppm)	10 ppm
Saskatchewan	OEL STEL (ppm)	15 ppm
Saskatchewan	OEL TWA (ppm)	10 ppm
Yukon	OEL STEL (mg/m <sup>3</sup> )	27 mg/m <sup>3</sup>
Yukon	OEL STEL (ppm)	15 ppm
Yukon	OEL TWA (mg/m <sup>3</sup> )	15 mg/m <sup>3</sup>
Yukon	OEL TWA (ppm)	10 ppm

### Propane (74-98-6)

USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1800 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1800 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA IDLH	US IDLH (ppm)	2100 ppm (10% LEL)
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m <sup>3</sup> )	1800 mg/m <sup>3</sup>
Québec	VEMP (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

### Butane (106-97-8)

USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL STEL (ppm)	750 ppm
British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
New Brunswick	OEL TWA (ppm)	800 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Nunavut	OEL STEL (mg/m <sup>3</sup> )	2576 mg/m <sup>3</sup>
Nunavut	OEL STEL (ppm)	1000 ppm
Nunavut	OEL TWA (mg/m <sup>3</sup> )	1901 mg/m <sup>3</sup>
Nunavut	OEL TWA (ppm)	800 ppm
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	2576 mg/m <sup>3</sup>
Northwest Territories	OEL STEL (ppm)	1000 ppm
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	1901 mg/m <sup>3</sup>
Northwest Territories	OEL TWA (ppm)	800 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>

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Québec	VEMP (ppm)	800 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm
Yukon	OEL STEL (mg/m <sup>3</sup> )	1600 mg/m <sup>3</sup>
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m <sup>3</sup> )	1400 mg/m <sup>3</sup>
Yukon	OEL TWA (ppm)	600 ppm
<b>Carbon dioxide (124-38-9)</b>		
USA ACGIH	ACGIH TWA (ppm)	5000 ppm
USA ACGIH	ACGIH STEL (ppm)	30000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
USA OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (ppm)	5000 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m <sup>3</sup> )	54000 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (STEL) (ppm)	30000 ppm
USA IDLH	US IDLH (ppm)	40000 ppm
Alberta	OEL STEL (mg/m <sup>3</sup> )	54000 mg/m <sup>3</sup>
Alberta	OEL STEL (ppm)	30000 ppm
Alberta	OEL TWA (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
Alberta	OEL TWA (ppm)	5000 ppm
British Columbia	OEL STEL (ppm)	15000 ppm
British Columbia	OEL TWA (ppm)	5000 ppm
Manitoba	OEL STEL (ppm)	30000 ppm
Manitoba	OEL TWA (ppm)	5000 ppm
New Brunswick	OEL STEL (mg/m <sup>3</sup> )	54000 mg/m <sup>3</sup>
New Brunswick	OEL STEL (ppm)	30000 ppm
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
New Brunswick	OEL TWA (ppm)	5000 ppm
Newfoundland & Labrador	OEL STEL (ppm)	30000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	5000 ppm
Nova Scotia	OEL STEL (ppm)	30000 ppm
Nova Scotia	OEL TWA (ppm)	5000 ppm
Nunavut	OEL STEL (mg/m <sup>3</sup> )	27000 mg/m <sup>3</sup>
Nunavut	OEL STEL (ppm)	15000 ppm
Nunavut	OEL TWA (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
Nunavut	OEL TWA (ppm)	5000 ppm
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	27000 mg/m <sup>3</sup>
Northwest Territories	OEL STEL (ppm)	15000 ppm
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
Northwest Territories	OEL TWA (ppm)	5000 ppm
Ontario	OEL STEL (ppm)	30000 ppm
Ontario	OEL TWA (ppm)	5000 ppm
Prince Edward Island	OEL STEL (ppm)	30000 ppm
Prince Edward Island	OEL TWA (ppm)	5000 ppm
Québec	VECD (mg/m <sup>3</sup> )	54000 mg/m <sup>3</sup>
Québec	VECD (ppm)	30000 ppm
Québec	VEMP (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
Québec	VEMP (ppm)	5000 ppm
Saskatchewan	OEL STEL (ppm)	30000 ppm

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Saskatchewan	OEL TWA (ppm)	5000 ppm
Yukon	OEL STEL (mg/m <sup>3</sup> )	27000 mg/m <sup>3</sup>
Yukon	OEL STEL (ppm)	15000 ppm
Yukon	OEL TWA (mg/m <sup>3</sup> )	9000 mg/m <sup>3</sup>
Yukon	OEL TWA (ppm)	5000 ppm

### Nitrogen (7727-37-9)

#### Methane (74-82-8)

USA ACGIH	ACGIH TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

#### Ethane (74-84-0)

USA ACGIH	ACGIH TWA (ppm)	1000 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

### Exposure Controls

**Appropriate Engineering Controls:** Gas detectors should be used when flammable gases/vapours may be released. Ensure adequate ventilation, especially in confined areas. Proper grounding procedures to avoid static electricity should be followed. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use explosion-proof equipment

**Personal Protective Equipment:** Protective goggles. Protective clothing. Respiratory protection of the dependent type. Insulated gloves



**Materials for Protective Clothing:** Chemically resistant materials and fabrics. Wear fire/flammable resistant/retardant clothing

**Hand Protection:** Wear chemically resistant protective gloves. Insulated gloves

**Eye Protection:** Chemical goggles or face shield.

**Skin and Body Protection:** Not available

**Respiratory Protection:** Use a NIOSH-approved self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

**Thermal Hazard Protection:** Wear suitable protective clothing.

**Other Information:** When using, do not eat, drink or smoke.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### Information on Basic Physical and Chemical Properties

**Physical State** : Gas

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<b>Appearance</b>	: Clear, Colorless gas
<b>Odor</b>	: Contains Ethyl Mercaptan for leak detection, which has a skunk-like odor, odorless.
<b>Odor Threshold</b>	: Not available
<b>pH</b>	: Not available
<b>Relative Evaporation Rate (butylacetate=1)</b>	: Not available
<b>Melting Point</b>	: Not available
<b>Freezing Point</b>	: Not available
<b>Boiling Point</b>	: -157 °C (-250.6°F)
<b>Flash Point</b>	: -187 °C (-304.6°F)
<b>Auto-ignition Temperature</b>	: > 288 °C (>550.4°F)
<b>Decomposition Temperature</b>	: Not available
<b>Flammability (solid, gas)</b>	: Extremely flammable gas
<b>Lower Flammable Limit</b>	: 3 %
<b>Upper Flammable Limit</b>	: 17 %
<b>Vapor Pressure</b>	: 40 mm Hg @25°C (77°F)
<b>Relative Vapor Density at 20 °C</b>	: 0.6
<b>Relative Density</b>	: Not available
<b>Specific Gravity</b>	: Not available
<b>Solubility</b>	: Not available
<b>Log Pow</b>	: Not available
<b>Log Kow</b>	: Not available
<b>Viscosity, Kinematic</b>	: Not available
<b>Viscosity, Dynamic</b>	: Not available
<b>Explosion Data – Sensitivity to Mechanical Impact</b>	: Not available
<b>Explosion Data – Sensitivity to Static Discharge</b>	: Not available

### SECTION 10: STABILITY AND REACTIVITY

**Reactivity:** Hazardous reactions will not occur under normal conditions.

**Chemical Stability:** Extremely flammable gas. Stable at standard temperature and pressure.

**Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.

**Conditions to Avoid:** Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks. Incompatible materials. Avoid ignition sources

**Incompatible Materials:** Strong acids. Strong bases. Strong oxidizers. Halogenated compounds. Chlorine

**Hazardous Decomposition Products:** Carbon oxides (CO, CO<sub>2</sub>). hydrocarbons. Sulfur dioxide and hydrogen sulfide are fatal and irritating gases.

### SECTION 11: TOXICOLOGICAL INFORMATION

#### Information on Toxicological Effects - Product

**Acute Toxicity** : Not classified

**LD50 and LC50 Data** Not available

**Skin Corrosion/Irritation:** Not classified

**Serious Eye Damage/Irritation:** Not classified

**Respiratory or Skin Sensitization:** Not classified

**Germ Cell Mutagenicity:** Not classified

**Teratogenicity:** Not available

**Carcinogenicity:** Not classified

**Specific Target Organ Toxicity (Repeated Exposure):** Not classified

**Reproductive Toxicity:** Not classified

**Specific Target Organ Toxicity (Single Exposure):** Not classified

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**Aspiration Hazard:** Not classified

**Symptoms/Injuries After Inhalation:** Gas can be toxic as a simple asphyxiant by displacing oxygen from the air. Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness.

**Symptoms/Injuries After Skin Contact:** Contact with the liquid may cause cold burns/frostbite.

**Symptoms/Injuries After Eye Contact:** This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns.

**Symptoms/Injuries After Ingestion:** Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

### **Information on Toxicological Effects - Ingredient(s)**

#### **LD50 and LC50 Data**

<b>Hydrogen sulfide (7783-06-4)</b>	
LC50 Inhalation Rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
ATE (gases)	100.000 ppmV/4h
<b>Propane (74-98-6)</b>	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)
<b>Butane (106-97-8)</b>	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)
<b>Ethane (74-84-0)</b>	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

## **SECTION 12: ECOLOGICAL INFORMATION**

### **Toxicity**

<b>Wellhead Natural Gas (CAS Mixture)</b>	
LC50 Fish 1	0.002 mg/l (Exposure time: 96 h - Species: Coregonus clupeaformis)
<b>Hydrogen sulfide (7783-06-4)</b>	
LC50 Fish 1	0.0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 Daphnia 1	0.022 mg/l (Exposure time: 96 h - Species: Gammarus pseudolimnaeus)
LC 50 Fish 2	0.016 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

### **Persistence and Degradability**

<b>Wellhead Natural Gas</b>	
Persistence and Degradability	Not established.

### **Bioaccumulative Potential**

<b>Wellhead Natural Gas</b>	
Bioaccumulative Potential	Not established.
<b>Hydrogen sulfide (7783-06-4)</b>	
BCF fish 1	(no bioaccumulation expected)
Log Pow	0.45 (at 25 °C)
<b>Propane (74-98-6)</b>	
Log Pow	2.3
<b>Butane (106-97-8)</b>	
Log Pow	2.89
<b>Carbon dioxide (124-38-9)</b>	
BCF fish 1	(no bioaccumulation)
Log Pow	0.83
<b>Ethane (74-84-0)</b>	
Log Pow	<= 2.8

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**Mobility in Soil** Not available

### **Other Adverse Effects**

**Other adverse effects:** Can cause frost damage to vegetation. Has photochemical ozone creation potential.

**Other Information:** Avoid release to the environment.

## **SECTION 13: DISPOSAL CONSIDERATIONS**

**Waste Disposal Recommendations:** Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

**Additional Information:** Handle empty containers with care because residual vapors are flammable. Empty gas cylinders should be returned to the vendor for recycling or refilling.

## **SECTION 14: TRANSPORT INFORMATION**

In Accordance With ICAO/IATA/DOT/TDG

### **UN Number**

UN-No.(DOT): 1971

DOT NA no.: UN1971

### **UN Proper Shipping Name**

DOT Proper Shipping Name : Natural gas, compressed  
(with high methane content)

Hazard Labels (DOT) : 2.1 - Flammable gases



DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Packaging Non Bulk (49 CFR 173.xxx) : 302

DOT Packaging Bulk (49 CFR 173.xxx) : 302

### **Additional Information**

Emergency Response Guide (ERG) Number : 115

### **Transport by sea**

DOT Vessel Stowage Location : E - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

### **Air transport**

DOT Quantity Limitations Passenger Aircraft/Rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo Aircraft Only (49 CFR 175.75) : 150 kg

## **SECTION 15: REGULATORY INFORMATION**

### **US Federal Regulations**

<b>Wellhead Natural Gas</b>	
<b>SARA Section 311/312 Hazard Classes</b>	Fire hazard Immediate (acute) health hazard Sudden release of pressure hazard
<b>Hydrogen sulfide (7783-06-4)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on SARA Section 302 (Specific toxic chemical listings) Listed on SARA Section 313 (Specific toxic chemical listings)	
<b>SARA Section 302 Threshold Planning Quantity (TPQ)</b>	500
<b>SARA Section 313 - Emission Reporting</b>	1.0 %



# Wellhead Natural Gas

## Safety Data Sheet

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### **Propane (74-98-6)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **Butane (106-97-8)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **Carbon dioxide (124-38-9)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **Nitrogen (7727-37-9)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **Methane (74-82-8)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **Ethane (74-84-0)**

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### **US State Regulations**

#### **Hydrogen sulfide (7783-06-4)**

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute  
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic  
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)  
U.S. - Colorado - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Toxic Endpoints  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Hawaii - Occupational Exposure Limits - STELs  
U.S. - Hawaii - Occupational Exposure Limits - TWAs  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)  
U.S. - Idaho - Occupational Exposure Limits - Acceptable Maximum Peak Above the Ceiling Concentration for an 8-Hour Shift  
U.S. - Idaho - Occupational Exposure Limits - Ceilings  
U.S. - Idaho - Occupational Exposure Limits - TWAs  
U.S. - Louisiana - Reportable Quantity List for Pollutants  
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants  
U.S. - Massachusetts - Allowable Ambient Limits (AALs)  
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Threshold Effects Exposure Limits (TEELs)  
U.S. - Michigan - Occupational Exposure Limits - STELs  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Michigan - Polluting Materials List  
U.S. - Michigan - Process Safety Management Highly Hazardous Chemicals  
U.S. - Minnesota - Chemicals of High Concern  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - STELs  
U.S. - Minnesota - Permissible Exposure Limits - TWAs

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U.S. - Montana - Ambient Air Quality Standards  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - TCEA - Extraordinarily Hazardous Substances (EHS)  
U.S. - New Mexico - Air Quality - Ambient Air Quality Standards  
U.S. - New York - Occupational Exposure Limits - TWAs  
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances  
U.S. - North Carolina - Control of Toxic Air Pollutants  
U.S. - North Dakota - Ambient Air Quality Standards - Maximum Permissible Concentrations  
U.S. - North Dakota - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues  
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities  
U.S. - Ohio - Extremely Hazardous Substances - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - Ceilings  
U.S. - Oregon - Permissible Exposure Limits - STELs  
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour  
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour  
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual  
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations  
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories  
U.S. - Tennessee - Occupational Exposure Limits - STELs  
U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Drinking Water Standards - Secondary Constituent Levels (SCLs)  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Vermont - Hazardous Waste - Hazardous Constituents  
U.S. - Vermont - Permissible Exposure Limits - STELs  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Virginia - Water Quality Standards - Chronic Freshwater Aquatic Life  
U.S. - Virginia - Water Quality Standards - Chronic Saltwater Aquatic Life  
U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List  
U.S. - Washington - Dangerous Waste - Discarded Chemical Products List  
U.S. - Washington - Permissible Exposure Limits - STELs  
U.S. - Washington - Permissible Exposure Limits - TWAs  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet  
U.S. - Wyoming - Process Safety Management - Highly Hazardous Chemicals  
U.S. - Alaska - Water Quality Standards - Chronic Aquatic Life Criteria for Fresh Water  
U.S. - Alaska - Water Quality Standards - Chronic Aquatic Life Criteria for Marine Water

### Propane (74-98-6)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities

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U.S. - Hawaii - Occupational Exposure Limits - TWAs  
U.S. - Idaho - Occupational Exposure Limits - TWAs  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - TWAs  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)  
U.S. - New York - Occupational Exposure Limits - TWAs  
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Washington - Permissible Exposure Limits - STELs  
U.S. - Washington - Permissible Exposure Limits - TWAs

### **Butane (106-97-8)**

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Hawaii - Occupational Exposure Limits - TWAs  
U.S. - Maine - Chemicals of High Concern  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Minnesota - Chemicals of High Concern  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - TWAs  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)  
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) List

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U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Washington - Permissible Exposure Limits - STELS  
U.S. - Washington - Permissible Exposure Limits - TWAs

### **Carbon dioxide (124-38-9)**

U.S. - Hawaii - Occupational Exposure Limits - STELS  
U.S. - Hawaii - Occupational Exposure Limits - TWAs  
U.S. - Idaho - Occupational Exposure Limits - TWAs  
U.S. - Maine - Air Pollutants - Greenhouse Gases (GHG)  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements  
U.S. - Michigan - Occupational Exposure Limits - STELS  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - STELS  
U.S. - Minnesota - Permissible Exposure Limits - TWAs  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New York - Occupational Exposure Limits - TWAs  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Tennessee - Occupational Exposure Limits - STELS  
U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Vermont - Permissible Exposure Limits - STELS  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Washington - Permissible Exposure Limits - STELS  
U.S. - Washington - Permissible Exposure Limits - TWAs

### **Nitrogen (7727-37-9)**

U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Right To Know List  
U.S. - Minnesota - Hazardous Substance List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Washington - Permissible Exposure Limits - Simple Asphyxiants

### **Methane (74-82-8)**

U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Delaware - Volatile Organic Compounds Exempt from Requirements  
U.S. - Maine - Air Pollutants - Greenhouse Gases (GHG)  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements

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U.S. - Minnesota - Hazardous Substance List  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Excluded Volatile Organic Compounds  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)  
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Washington - Permissible Exposure Limits - Simple Asphyxiants

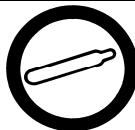
### Ethane (74-84-0)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities  
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Delaware - Volatile Organic Compounds Exempt from Requirements  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements  
U.S. - Minnesota - Hazardous Substance List  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Excluded Volatile Organic Compounds  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)  
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Washington - Permissible Exposure Limits - Simple Asphyxiants

### Canadian Regulations

#### Wellhead Natural Gas

WHMIS Classification	Class B Division 1 - Flammable Gas Class A - Compressed Gas
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#### Hydrogen sulfide (7783-06-4)

Listed on the Canadian DSL (Domestic Substances List) inventory.  
Listed on the Canadian Ingredient Disclosure List

# Wellhead Natural Gas

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WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects
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### Propane (74-98-6)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas
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### Butane (106-97-8)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Listed on the Canadian Ingredient Disclosure List

WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas
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### Carbon dioxide (124-38-9)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Listed on the Canadian Ingredient Disclosure List

WHMIS Classification	Class A - Compressed Gas
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### Nitrogen (7727-37-9)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class A - Compressed Gas
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### Methane (74-82-8)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas
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### Ethane (74-84-0)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas
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This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

## SECTION 16: OTHER INFORMATION

**Revision date** : 10/02/2013

**Other Information** : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

### GHS Full Text Phrases:

Acute Tox. 2 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 2
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Simple Asphy	Simple Asphyxiant
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated
H330	Fatal if inhaled
H400	Very toxic to aquatic life

### Party Responsible for the Preparation of This Document

# Wellhead Natural Gas

## Safety Data Sheet

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Williams, Inc.  
One Williams Center  
Tulsa, OK 74172, US  
800-688-7507

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*

North America GHS US 2012 & WHMIS



# MATERIAL SAFETY DATA SHEET

## 1 PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Natural Gas Condensate

**Synonyms:** Condensate, Gas Condensate, Distillate, Pipeline Drip, Natural gasoline, Casinghead gasoline, Straight-run gasoline, Isoparaffin mixture, and Drip gas

**Manufacturer Name:**

Williams, Inc.  
One Williams Center  
Tulsa, OK 74172  
USA

**Emergency Telephone:**

888-677-2370

**Non-emergency Telephone:**

800-688-7507

**Intended Use:** Industrial use

## 2 HAZARDS IDENTIFICATION

**Emergency Overview**

**Physical State:** Liquid

**Color:** Colorless to brownish-black

**Odor:** Petroleum

**DANGER!**

Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.

Extremely flammable liquid and vapor - vapor may cause flash fire.

**Potential Health Effects**

**Inhalation:** Harmful if inhaled. May cause central nervous system effects.

**Eye Contact:** Causes eye irritation. High vapor concentrations may cause irritation.

**Skin Contact:** Harmful if absorbed through skin. Causes skin irritation.

**Ingestion:** Harmful if swallowed - may enter lungs if swallowed or vomited.

**Chronic Health Effects:** Long-term exposure to condensate vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic condensate abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of condensate as a motor fuel. Prolonged and repeated exposure to benzene may



cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

**Target Organ(s):** | Central nervous system | Eye | Kidney | Liver | Skin | Blood and/or blood-forming organs |

**OSHA Regulatory Status:** This product is hazardous according to OSHA 29CFR 1910.1200.

### 3 COMPOSITION / INFORMATION ON INGREDIENTS

**General Information:** Condensate is a complex mixture of volatile hydrocarbons, primarily in the C3 to C8 range. The composition varies depending on the natural gas source and processing, but typically includes some concentration of benzene.

Chemical Name	CAS-No.	Concentration*
†Natural gas condensates (petroleum)	68919-39-1	97.9 - 99.6%
†Benzene	71-43-2	0.4 - 2.1%

\* All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

† This chemical is hazardous according to OSHA/WHMIS criteria.

### 4 FIRST AID MEASURES

**Inhalation:** Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Eye Contact:** Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

**Skin Contact:** Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

**Ingestion:** Call a physician or poison control center immediately. DO NOT induce vomiting. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head lower than the hips to help prevent aspiration.

### 5 FIRE-FIGHTING MEASURES

**Extinguishing Media:** Extinguish with foam, carbon dioxide, dry powder or water fog.

**Unsuitable Extinguishing Media:** Not applicable.

**Special Fire Fighting Procedures:** Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Use water spray to keep fire-exposed containers cool.

**Unusual Fire & Explosion Hazards:** Material will float and may ignite on surface of water. Vapors may travel considerable distance to a source of ignition and flash back. Vapors may cause a flash fire or ignite explosively.

**Hazardous Combustion Products:** Carbon Oxides

<b>6</b>	<b>ACCIDENTAL RELEASE MEASURES</b>
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**Personal Precautions:** Wear protective clothing as described in Section 8 of this safety data sheet.

**Spill Cleanup Methods:** Eliminate all ignition sources. Small Liquid Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Large Spillages: Use water spray to disperse vapors and flush spill area. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

<b>7</b>	<b>HANDLING AND STORAGE</b>
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**Handling:** Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

**Storage:** Keep away from heat, sparks and open flame. Keep container tightly closed and in a well-ventilated place. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids. Keep away from food, drink and animal feed. Store away from incompatible materials.

<b>8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
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**Exposure Limits:**

Chemical Name	Source	Type	Exposure Limits	Notes
Benzene	CA. Alberta OELs	STEL	16 mg/m <sup>3</sup> 5 ppm	Skin
Benzene	CA. Alberta OELs	TWA	3.2 mg/m <sup>3</sup> 1 ppm	Skin
Benzene	CA. British Columbia OELs	TWA	0.5 ppm	Skin
Benzene	CA. British Columbia OELs	STEL	2.5 ppm	Skin
Benzene	CA. Ontario OELs	STEL	2.5 ppm	
Benzene	CA. Ontario OELs	TWA	0.5 ppm	
Benzene	CA. Quebec OELs	TWA	3 mg/m <sup>3</sup> 1 ppm	
Benzene	CA. Quebec OELs	STEL	15.5 mg/m <sup>3</sup> 5 ppm	
Benzene	MEX. OELs	STEL	16 mg/m <sup>3</sup> 5 ppm	
Benzene	MEX. OELs	TWA	3.2 mg/m <sup>3</sup> 1 ppm	
Benzene	US. ACGIH TLV	STEL	2.5 ppm	Skin
Benzene	US. ACGIH TLV	TWA	0.5 ppm	Skin
Benzene	US. NIOSH Guide	IDLH	500 ppm	
Benzene	US. OSHA Spec. Reg.	OSHA Action level	0.5 ppm	
Benzene	US. OSHA Spec. Reg.	STEL	5 ppm	
Benzene	US. OSHA Spec. Reg.	TWA	1 ppm	
Benzene	US. OSHA Z-2 PEL	TWA	10 ppm	
Benzene	US. OSHA Z-2 PEL	Maximum concentration	50 ppm	
Benzene	US. OSHA Z-2 PEL	Ceiling	25 ppm	

**Engineering Controls:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Respiratory Protection:** If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

**Eye Protection:** Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed.

**Hand Protection:** Wear chemical-resistant gloves. Contact glove manufacturer for specific information.

**Skin Protection:** Wear appropriate chemical resistant clothing to prevent any possibility of skin contact.

**Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

**Environmental Exposure Controls:** Environmental manager must be informed of all major spillages.

<b>9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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**Color:** Colorless to brownish-black

**Odor:** Petroleum

**Odor Threshold:** No data available.

**Physical State:** Liquid

**pH:** Not applicable

**Melting Point:** No data available.

**Freezing Point:** No data available.

**Boiling Point:** 45°C (113°F) - 404°C (759°F)

**Flash Point:** <-18°C (0°F) (Approximate)

**Evaporation Rate:** >100 [vs. n-Butyl Acetate = 1]

**Flammability (Solid):** No data available.

**Flammability Limit - Upper (%):** 10 (Approximate)

**Flammability Limit - Lower (%):** 1 (Approximate)

**Vapor Pressure:** 51 mmHg - 857 mmHg @100°F [Reid]

**Vapor Density (Air=1):** > 1

**Specific Gravity:** 0.766 - 0.87

**Solubility in Water:** Negligible

**Solubility (Other):** No data available.

**Partition Coefficient (n-Octanol/water):** No data available.

**Autoignition Temperature:** No data available.

**Decomposition Temperature:** No data available.

**Viscosity:** < 1 cst @38°C

**Percent Volatile:** 100 %vol

**Explosive Properties:** No data available

<b>10</b>	<b>STABILITY AND REACTIVITY</b>
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**Stability:** Stable under the prescribed storage conditions.

**Conditions to Avoid:** Keep away from heat, sparks and open flame. Prevent buildup of vapors or gases to explosive concentrations.

**Incompatible Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** No data available.

<b>11</b>	<b>TOXICOLOGICAL INFORMATION</b>
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**Specified Substance(s)**

**Acute Toxicity:**

**Test Results:**

Chemical Name	Test Results
Natural gas condensates (petroleum)	Dermal LD50 (Rabbit): > 3750 mg/kg
Natural gas condensates (petroleum)	Inhalation LC50 (Rat): > 5.2 mg/l
Natural gas condensates (petroleum)	Oral LD50 (Rat): > 5000 mg/kg

**Chronic Toxicity:** Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.

**Listed Carcinogens:**

Chemical Name	IARC	NTP	OSHA	ACGIH
Benzene	1	Listed	Listed	A1

IARC: 1 = Carcinogenic to Humans; 2A = Probably Carcinogenic to Humans; 2B = Possibly Carcinogenic to Humans; 3 = Not classifiable as to carcinogenicity to humans; 4 = Probably not carcinogenic to humans; Not listed = Not evaluated by IARC.

ACGIH: A1 = Confirmed Human Carcinogen; A2 = Suspected Human Carcinogen; A3 = Confirmed Animal Carcinogen; A4 = Not classifiable as a human carcinogen; A5 = Not suspected to be a human carcinogen; Not listed = Not evaluated by ACGIH.

**Product Information**

**Acute Toxicity:**

**Test Results:** No test data available for the product.

**Other Acute:** Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes severe skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.

**Chronic Toxicity:** Long-term exposure to gasoline vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic gasoline abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of gasoline as a motor fuel.

<b>12</b>	<b>ECOLOGICAL INFORMATION</b>
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**Ecotoxicity:** There are no data on the ecotoxicity of this product.

**Mobility:** No data available.

**Persistence and Degradability:** No data available.

**Bioaccumulation Potential:** No data available.

<b>13</b>	<b>DISPOSAL CONSIDERATIONS</b>
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**General Information:** Dispose of waste and residues in accordance with local authority requirements.

**Disposal Methods:** No specific disposal method required.

**Container:** Since emptied containers retain product residue, follow label warnings even after container is emptied.

<b>14</b>	<b>TRANSPORT INFORMATION</b>
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**DOT**

**UN No.:** UN1993

**Proper Shipping Name:** Flammable liquids, n.o.s. (Natural gas condensates)

**Class:** 3

**Packing Group:** II

**Label(s):** 3

**TDG**

**UN No.:** UN1993

**Proper Shipping Name:** Flammable liquid, n.o.s. (Natural gas condensates)

**Class:** 3

**Packing Group:** II

**IATA**

**UN No.:** UN1993

**Proper Shipping Name:** Flammable liquid, n.o.s. (Natural gas condensates)

**Class:** 3

**Packing Group:** II

**Label(s):** 3

**IMDG**

**UN No.:** UN1993

**Proper Shipping Name:** Flammable liquid, n.o.s. (Natural gas condensates)

**Class:** 3

**Packing Group:** II

**EmS No.:** F-E, S-E

<b>15</b>	<b>REGULATORY INFORMATION</b>
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**Canadian Controlled Products Regulations:** This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

**WHMIS Classification:** B2, D2A, D2B

**Mexican Dangerous Statement:** This product is dangerous according to Mexican regulations.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-.1052):**

Chemical Name	CAS-No.
Benzene	71-43-2

**Inventory Status**

This product or all components are listed or exempt from listing on the following inventory: TSCA

**US Regulations**

**CERCLA Hazardous Substance List (40 CFR 302.4):**

Chemical Name	RQ
Benzene	10 lbs

**SARA Title III**

**Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A):** Not regulated.

**Section 311/312 (40 CFR 370):**

Acute (Immediate)     Chronic (Delayed)     Fire     Reactive     Pressure Generating

**Section 313 Toxic Release Inventory (40 CFR 372):**

Chemical Name	CAS-No.	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Benzene	71-43-2	10000 lbs	25000 lbs

For reporting purposes: the De Minimis Concentration for a toxic chemical in a mixture is 0.1% for carcinogens as defined in 29 CFR 1910.1200(d)(4) or 1% for others.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):**

Not regulated.

**Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3):** Benzene

**Drug Enforcement Act:** Not regulated.

**TSCA**

**TSCA Section 4(a) Final Test Rules & Testing Consent Orders:** Not regulated.

**TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E):** Not regulated.

**TSCA Section 5(e) PMN-Substance Consent Orders:** Not regulated.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D):** Not regulated.

**State Regulations****California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):** Benzene**Massachusetts Right-To-Know List:** Benzene**Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)):** Benzene**Minnesota Hazardous Substances List:** Benzene**New Jersey Right-To-Know List:** Benzene**Pennsylvania Right-To-Know List:** Benzene**Rhode Island Right-To-Know List:** Benzene**16 OTHER INFORMATION****HAZARD RATINGS**

	<b>Health Hazard</b>	<b>Fire Hazard</b>	<b>Instability</b>	<b>Special Hazard</b>
<b>NFPA</b>	2	4	0	NONE

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	<b>Health Hazard</b>	<b>Flammability</b>	<b>Physical Hazard</b>	<b>Personal Protection</b>
<b>HMIS</b>	2*	4	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe \*- Chronic Health Effect

HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

**Issue Date:** 31-Mar-2009**Supersedes Date:** 28-Jul-1999**SDS No.:** 1023419

**Disclaimer:** This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

**SECTION 1 – MATERIAL IDENTIFICATION AND USE****Material Name:** PRODUCED WATER (SWEET - FROM CRUDE OIL OR DEEP GAS PRODUCTION)**Use:** Process stream, waste**WHMIS Classification:** Class B, Div. 2; Class D, Div. 2, Sub-Div. A and B**NFPA:** Fire: 3 Reactivity: 0 Health: 2**TDG:** UN: 1267 Class: 3 Packing Group: II**Shipping Name:** PETROLEUM CRUDE OIL**Manufacturer/Supplier:** ENCANACORPORATION#1800, 855 - 2<sup>nd</sup> Street S.W., P.O. BOX 2850

CALGARY, ALBERTA, T2P 2S5

**Emergency Telephone:** (403) 645-3333**Chemical Family:** Water with C5+ aliphatic and aromatic hydrocarbons.**SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL**

<b>Hazardous Ingredients</b>	<b>Approximate Concentrations (%)</b>	<b>C.A.S. Nos.</b>	<b>LD50/LC50 (Incl. Species &amp; Route)</b>	<b>Exposure Limits</b>
Sodium chloride	5-20	7647-14-05	N.Av.	N.Av.
n-Hexane	0.1-1	110-54-3	LD50, rat, oral, 28.7 g/kg	50 ppm (OEL, TLV)
Benzene	0.1-1	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	0.5 ppm (OEL) 0.5 ppm (TLV)

OEL = 8 hr. Alberta Occupational Exposure Limit; TLV = Threshold Limit Value (8 hrs)

**SECTION 3 – PHYSICAL DATA FOR MATERIAL****Physical State:** Liquid**Specific Gravity:** 1.0 - 1.1 @ 20 degrees C**Vapour Density (air=1):** 2.5-3.0**Percent Volatiles, by volume:** 100**pH:** N.Av.**Coefficient of Water/Oil Distribution:** >100 / 1**Odour & Appearance:** colorless/straw coloured liquid, hydrocarbon odour

(N.A.V. = not available N.App. = not applicable)

**Vapour Pressure (mmHg):** 20 @ 20 deg. C.**Odour Threshold (ppm):** N.Av.**Evaporation Rate:** N.Av.**Boiling Pt. (deg.C):** 50 to 100**Freezing Pt. (deg.C):** -10 to 0 (est.)**SECTION 4 – FIRE AND EXPLOSION****Flammability:** Yes **Conditions:** Bulk of material is water, and will not ignite. However, sufficient hydrocarbon vapour may be present to cause flash fire at normal temperatures\*.**Means of Extinction:** Foam, CO2, dry chemical. Explosive accumulations can build up in areas of poor ventilation\*.**Special Procedures:** Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. If safe to do so, cut off supply and allow flame to burn out\*.**Flash Point (deg.C) & Method:** <-40 (TCC) (hydrocarbons)\***Upper Explosive Limit (% by vol.):** 8\***Lower Explosive Limit (% by vol.):** 1\***Auto Ignition Temp. (deg.C):** 260\***Hazardous Combustion Products:** Carbon monoxide, carbon dioxide\***Sensitivity to Impact:** No**Sensitivity to Static Discharge:** Yes, may ignite\***TDG Flammability Classification:** Class 3\*

\*Assuming hydrocarbon content is high enough to ignite. Hydrocarbons may derive from the original produced water or contamination through transportation in a tank that had previously contained crude oil.



## SECTION 5 – REACTIVITY DATA

**Chemical Stability:** Yes **Conditions:** Heat

**Incompatibility:** Yes **Substances:** Oxidizing agents (e.g. chlorine, compressed oxygen)

**Reactivity:** Yes **Conditions:** Heat, strong sunlight

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide

## SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

**Routes of Entry:**

**Skin Absorption:** Yes

**Skin Contact:** Yes (liquid)

**Eye Contact:** Yes

**Inhalation: Acute:** Yes

**Chronic:** Yes

**Ingestion:** Yes

**Effects of Acute Exposure:** Vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. Hydrocarbons absorbed through intact skin. Contact of liquid with eyes may cause severe irritation.

**Effects of Chronic Exposure:** Due to presence of benzene and n-hexane, long term exposure may increase the risk of anaemia, leukaemia and nervous system damage.

**Sensitization to Product:** N.Av.

**Exposure Limits of Product:** 0.5 ppm (8 hr Alberta OEL for benzene)

**Irritancy:** Yes

**Synergistic Materials:** None reported

**Carcinogenicity:** Yes **Reproductive Effects:** Possibly **Teratogenicity:** Possibly **Mutagenicity:** Possibly

## SECTION 7 – PREVENTIVE MEASURES

**Personal Protective Equipment:** Use positive pressure self-contained breathing apparatus, supplied air breathing apparatus, or cartridge respirator approved for organic vapours where concentrations may exceed exposure limits.

**Gloves:** Viton (nitrile adequate for short exposure to liquid)

**Respiratory:** SCBA, SABA or cartridge respirator approved for organic vapours.

**Eye:** Chemical splash goggles

**Footwear:** As per safety policy. **Clothing:** As per fire protection policy.

**Engineering Controls:** Use only in well ventilated areas. Mechanical ventilation required in confined areas. Equipment must be explosion proof.

**Leaks & Spills:** Stop leak if safe to do so. Use personal protective equipment. Use water spray to cool containers.

Remove all ignition sources. Provide explosion-proof clearing ventilation, if possible. Prevent from entering confined spaces, or from contaminating land and water courses. Dyke and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.

**Waste Disposal:** Contact appropriate regulatory authorities for disposal requirements.

**Handling Procedures & Equipment:** Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers.

Avoid sparking conditions.

**Storage Requirements:** Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.

**Special Shipping Information:** N.Av.

## SECTION 8 – FIRST AID MEASURES

**Skin:** Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large areas of contact.

**Eye:** Immediately flush with large amounts of luke warm water for 15 minutes, lifting upper and lower lids at intervals. Get medical attention if irritation persists.

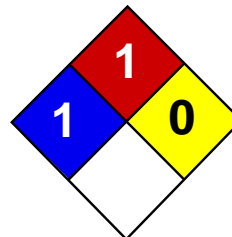
**Inhalation:** Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Get immediate medical attention.

**Ingestion:** Give 2-3 glasses of milk or water to drink. DO NOT INDUCE VOMITING. Keep warm and at rest. Get immediate medical attention.

## SECTION 9 – PREPARATION DATE OF MSDS

Prepared By: Encana Environment, Health and Safety (EHS)

Phone Number: (403) 645-2000 Preparation Date: July 1, 2011 Expiry Date: July 1, 2014



Health	1
Fire	1
Reactivity	0
Personal Protection	J

## Material Safety Data Sheet

### Triethylene glycol MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Triethylene glycol

**Catalog Codes:** SLT2644

**CAS#:** 112-27-6

**RTECS:** YE4550000

**TSCA:** TSCA 8(b) inventory: Triethylene glycol

**CI#:** Not available.

**Synonym:** 2,2'-[1,2-Ethanediy]bis(oxy)]bisethanol

**Chemical Formula:** C<sub>6</sub>H<sub>14</sub>O<sub>4</sub>

**Contact Information:**

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Triethylene glycol	112-27-6	100

**Toxicological Data on Ingredients:** Triethylene glycol: ORAL (LD50): Acute: 17000 mg/kg [Rat].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

**Potential Chronic Health Effects:**

Very hazardous in case of eye contact (irritant). Slightly hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

**Skin Contact:** No known effect on skin contact, rinse with water for a few minutes.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** 371°C (699.8°F)

**Flash Points:** CLOSED CUP: 177°C (350.6°F). OPEN CUP: 165.5°C (329.9°F).

**Flammable Limits:** LOWER: 0.9% UPPER: 9.2%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

## Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes. If ingested, seek medical advice immediately and show the container or the label.

**Storage:**

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:** Splash goggles. Lab coat.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Hygroscopic liquid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 150.18 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not available.

**Boiling Point:** 285°C (545°F)

**Melting Point:** -5°C (23°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.1274 (Water = 1)

**Vapor Pressure:** Not available.

**Vapor Density:** 5.17 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water.

**Solubility:** Easily soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

### Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 17000 mg/kg [Rat].

**Chronic Effects on Humans:** The substance is toxic to kidneys, the nervous system.

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion. Slightly hazardous in case of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Triethylene glycol TSCA 8(b) inventory: Triethylene glycol

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):** R41- Risk of serious damage to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** j

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Not applicable. Lab coat. Not applicable. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:31 PM

**Last Updated:** 05/21/2013 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

**ATTACHMENT I**  
**Emission Units Table**

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

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- **Emissions Unit Table**
-

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment I**

**EMISSION UNITS TABLE**

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

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed/Modified	Design Capacity	Type <sup>3</sup> and Date of Change	Control Device <sup>4</sup>
CE-01	1E	Caterpillar G3516B Engine	2014	1,380 bhp	Existing	01-OxCat
CE-02	2E	Caterpillar G3516B Engine	2014	1,380 bhp	Existing	02-OxCat
CE-03	3E	Caterpillar G3306B TA Engine	2014	203 bhp	Existing	01-NSCR
RBV-1	4E	Dehydrator Reboiler 01	2014	1.66 MMBtu/hr	Existing	na
RSV-1	5E	Dehydrator Still Vent 01	2014	60.0 MMscfd	Existing	01-COMB
	6E	Dehydrator Flash Tank 01	2014		Existing	01-COMB
RBV-2	7E	Dehydrator Reboiler 02	tbd	1.66 MMBtu/hr	Existing	na
RSV-2	8E	Dehydrator Still Vent 02	tbd	60.0 MMscfd	Existing	01-COMB
	9E	Dehydrator Flash Tank 02	tbd		Existing	01-COMB
COMB-1	10E	Thermal Oxidizer 01	2014	6.41 MMBtu/hr	Existing	na
HTR-01	11E	Heater Treater 01	2014	1.55 MMBtu/hr	Existing	na
HTR-02	12E	Condensate Stabilizer Heater 01	2014	2.55 MMBtu/hr	Existing	na
T01	13E	Produced Water Tank 01	2014	48 bbl	Existing	na
TLO-1	14E	Truck Load-Out Produced Water	2014	10,400 gal/yr	Existing	na
TLO-2	15E	Truck Load-Out Stabilized Condensate	2014	250,000 gal/yr	Existing	na
SSM	16E	Start/Stop/Maintenance (Via Dispersion Stack)	2014	3,363 bhp	Modified	na
FUG-G	17E	Process Piping Fugitives Gas/Vapor	2014/tbd	1,953 fittings	Modified	na
FUG-L		Process Piping Fugitives Light Liquid (Condensate)	2014/tbd	2,468 fittings	Modified	na
RPC (Prior FUG2)	18E	Rod Packing/Crankcase Leaks	2014	5 Recips	Modified	na
HTR-03	19E	Station Recycle Line Heater 01	2015	1.7 MMBtu/hr	Existing	na
HTR-04	20E	Condensate Stabilizer Heater 02	tbd	9.7 MMBtu/hr	New	na
T02	21E	Produced Water Tank 02	2015	210 bbl	Existing	na

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

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

<sup>3</sup> New, modification, removal, etc.

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



## ATTACHMENT J

### Emission Points Data Summary Sheet

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

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- **Table 1 – Emissions Data**

- Compressor Engines 01 and 02 w/ OxCat (Each)
- Compressor Engine 03 w/ NSCR
- Rod Packing/Crankcase Leaks (RPC)
- Start/Stop/Maintenance (w/ Blowdown) (SSM)
- Dehydrator Reboilers 01 and 02 (Each)
- Dehydrators 01 and 02 (Each)
- Thermal Oxidizer 01
- Heater Treater
- Condensate Stabilizer Heater 01
- Station Recycle Line Heater
- Condensate Stabilizer Heater 02
- Produced Water Storage Tank 01
- Produced Water - Truck Load-Out 01
- Condensate - Truck Load-Out 02
- Produced Water Storage Tank 02
- FACILITY-WIDE SUMMARY

- **Table 2 – Release Parameter Data**

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**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Compressor Engines 01 and 02 w/ OxCat (Each)**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )								
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr											
CE-01 (1E) and CE-02 (2E) (Each)	Upward Vertical	CE-01 (1E) and CE-02 (2E) (Each)	CE-01 (1E) and CE-02 (2E) (Each)	01-OxCat and 02-OxCat	OxCat	C	8760 (Each)	NOX	1.52	6.66	1.52	6.66	Gas	Vendor									
								<b>1,380 bhp CAT G3516B (4SLB@1,400 rpm) Compressor Engines 01 and 02 w/ OxCat (Each)</b>								CO	9.37	41.04	0.50	2.20	Gas	Vendor	
								VOC	4.32	18.92	0.56	2.47	Gas	Vendor									
								SO2	0.01	0.03	0.01	0.03	Gas	AP-42									
								PM10/2.5	0.11	0.50	0.11	0.50	Solid/Gas	AP-42									
								Benzene	0.01	0.02	4.6E-04	2.0E-03	Gas	AP-42									
								Ethylbenzene	4.5E-04	0.00	4.2E-05	1.8E-04	Gas	AP-42									
								HCHO	1.10	4.80	0.27	1.17	Gas	Vendor									
								n-Hexane	0.01	0.06	1.2E-03	0.01	Gas	AP-42									
								Methanol	0.03	0.12	0.00	0.01	Gas	AP-42									
								Toluene	4.7E-03	0.02	4.3E-04	1.9E-03	Gas	AP-42									
								2,2,4-TMP	2.9E-03	0.01	2.6E-04	1.2E-03	Gas	AP-42									
								Xylenes	2.1E-03	0.01	1.9E-04	8.5E-04	Gas	AP-42									
								Other HAP	0.16	0.72	0.02	0.07	Gas	AP-42									
								Total HAP	1.32	5.76	0.29	1.26	Gas	Sum									
								CO	1,570	6,876	1,570	6,876	Gas	AP-42									
								CH4	5.99	26.25	5.99	26.25	Gas	Vendor									
								N2O	2.5E-03	0.01	2.5E-03	0.01	Gas	Ap-42									
CO2e	1,720	7,536	1,720	7,536	Gas	Wgt Sum																	

Continued ...

**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Compressor Engine 03 w/ NSCR**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
CE-03 (3E)	Upward Vertical	CE-03 (3E)	CE-03 (3E)	03-NSCR	NSCR	C	8,760	NOX	6.83	29.91	0.20	0.90	Gas	Vendor	
								CO	6.83	29.91	0.89	3.89	Gas	Vendor	
								VOC	0.20	0.86	0.20	0.86	Gas	Vendor	
								SO2	1.1E-03	4.8E-03	1.1E-03	4.8E-03	Gas	AP-42	
								PM10/2.5	0.04	0.16	0.04	0.16	Solid/Gas	AP-42	
								Benzene	0.00	0.01	2.9E-03	1.3E-02	Gas	AP-42	
								Ethylbenzene	4.6E-05	0.00	4.6E-05	2.0E-04	Gas	AP-42	
								HCHO	0.09	0.39	0.09	0.39	Gas	Vendor	
								n-Hexane	---	---	---	---	Gas	AP-42	
								Methanol	0.01	0.02	0.01	0.02	Gas	AP-42	
								Toluene	1.0E-03	0.00	1.0E-03	4.5E-03	Gas	AP-42	
								2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	3.6E-04	0.00	3.6E-04	1.6E-03	Gas	AP-42	
								Other HAP	0.01	0.05	0.01	0.05	Gas	AP-42	
								Total HAP	0.11	0.49	0.11	0.49	Gas	Sum	
								CO	254	1,113	254	1,113	Gas	AP-42	
								CH4	0.19	0.84	0.19	0.84	Gas	Vendor	
N2O	4.1E-04	0.00	4.1E-04	0.00	Gas	Ap-42									
CO2e	259	1,135	259	1,135	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Rod Packing/Crankcase Leaks (RPC)**

**Table 1: Emissions Data**

Emission Point ID No. <i>(Must match Emission Units Table &amp; Plot Plan)</i>	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> <i>(Speciate VOCs &amp; HAPS)</i>	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> <i>(ppmv or mg/m<sup>3</sup>)</i>
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RPC (fka-FUG2) (18E)	na	RPC (fka-FUG2) (18E)	RPC (fka-FUG2) (18E)	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	6.32	27.66	6.32	27.66	Gas	Vendor	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	0.04	0.16	0.04	0.16	Gas	Vendor	
								Ethylbenzene	0.04	0.16	0.04	0.16	Gas	Vendor	
								HCHO	0.02	0.09	0.02	0.09	Gas	Vendor	
								n-Hexane	0.04	0.16	0.04	0.16	Gas	Vendor	
								Methanol	---	---	---	---	Gas	---	
								Toluene	0.04	0.16	0.04	0.16	Gas	Vendor	
								2,2,4-TMP	0.04	0.16	0.04	0.16	Gas	Vendor	
								Xylenes	0.04	0.16	0.04	0.16	Gas	Vendor	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	0.24	1.05	0.24	1.05	Gas	Sum	
								CO	29	128	29	128	Gas	Vendor	
								CH4	14.70	64.37	14.70	64.37	Gas	Vendor	
N2O	---	---	---	---	Gas	---									
CO2e	397	1,738	397	1,738	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Start/Stop/Maintenance (w/ Blowdown) (SSM)**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
SSM (16E)	na	SSM (16E)	SSM (16E)	na	na	I/C	Mixed (~160 hrs/hr plus continuous purge)	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	---	42.84	---	42.84	Gas	Vendor	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	0.02	---	0.02	Gas	Vendor	
								Ethylbenzene	---	0.02	---	0.02	Gas	Vendor	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	1.10	---	1.10	Gas	Vendor	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	0.09	---	0.09	Gas	Vendor	
								2,2,4-TMP	---	0.54	---	0.54	Gas	Vendor	
								Xylenes	---	0.13	---	0.13	Gas	Vendor	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	1.89	---	1.89	Gas	Sum	
								CO	---	---	---	---	Gas	---	
								CH4	---	75.44	---	75.44	Gas	Vendor	
N2O	---	---	---	---	Gas	---									
CO2e	---	1,886	---	1,886	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Dehydrator Reboilers 01 and 02 (Each)**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RBV-01 (4E) and RBV-02 (7E)	Upward Vertical	1.66 MMBtu/hr Dehydrator Reboilers 01 and 02 (Each)		na	na	C	8760 (Each)	NOX	0.16	0.71	0.16	0.71	Gas	---	
								CO	0.14	0.60	0.14	0.60	Gas	---	
		VOC	0.01					0.04	0.01	0.04	Gas	AP-42			
		SO2	9.8E-04					4.3E-03	9.8E-04	4.3E-03	Gas	---			
		PM10/2.5	0.01					0.05	0.01	0.05	Solid/Gas	---			
		Benzene	3.4E-06					1.5E-05	3.4E-06	1.5E-05	Gas	AP-42			
		Ethylbenzene	---					---	---	---	Gas	AP-42			
		HCHO	1.2E-04					5.4E-04	1.2E-04	5.4E-04	Gas	AP-42			
		n-Hexane	2.9E-03					0.01	2.9E-03	0.01	Gas	AP-42			
		Methanol	---					---	---	---	Gas	---			
		Toluene	5.5E-06					2.4E-05	5.5E-06	2.4E-05	Gas	AP-42			
		2,2,4-TMP	---					---	---	---	Gas	AP-42			
		Xylenes	---					---	---	---	Gas	AP-42			
		Other HAP	3.1E-06					1.4E-05	3.1E-06	1.4E-05	Gas	---			
		Total HAP	3.1E-03					0.01	3.1E-03	0.01	Gas	Sum			
		CO	196					857	196	857	Gas	AP-42			
		CH4	3.8E-03					0.02	3.8E-03	0.02	Gas	AP-42			
N2O	3.6E-03	0.02	3.6E-03	0.02	Gas	---									
CO2e	197	862	197	862	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Dehydrators 01 and 02 (Each)**

**Table 1: Emissions Data**

Emission Point ID No. <i>(Must match Emission Units Table &amp; Plot Plan)</i>	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> <i>(Speciate VOCs &amp; HAPS)</i>	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> <i>(ppmv or mg/m<sup>3</sup>)</i>
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RSV-1 (5E/6E) and RSV-2 (8E/9E) (Each)	Upward Vertical	<b>60 MMscfd Dehydrators 01 and 02 (Still Vent and Flash Tank Off-Gas) (Each)</b>				C	8760 (Each)	NOX	---	---	---	---	Gas	---	
		CO	---	---	---			---	Gas	---					
		VOC	110.64	484.62	1.11			4.85	Gas	GLYCalc					
		SO2	---	---	---			---	Gas	---					
		PM10/2.5	---	---	---			---	Solid/Gas	---					
		Benzene	1.97	8.64	0.02			0.09	Gas	GLYCalc					
		Ethylbenzene	2.05	9.00	0.02			0.09	Gas	GLYCalc					
		HCHO	---	---	---			---	Gas	GLYCalc					
		n-Hexane	2.32	10.18	0.02			0.10	Gas	GLYCalc					
		Methanol	---	---	---			---	Gas	---					
		Toluene	9.03	39.55	0.09			0.39	Gas	GLYCalc					
		2,2,4-TMP	1.71	7.48	0.02			0.07	Gas	GLYCalc					
		Xylenes	18.95	82.98	0.19			0.83	Gas	GLYCalc					
		Other HAP	---	---	---			---	Gas	---					
		Total HAP	36.15	158.33	0.36			1.57	Gas	Sum					
		CO	---	---	---			---	Gas	---					
		CH4	22.64	99.17	0.23			0.99	Gas	GLYCalc					
N2O	---	---	---	---	Gas	---									
CO2e	566	2,479	6	25	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Thermal Oxidizer 01**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )							
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr										
COMB-1 (10E)	Flare	COMB-1 (10E)	COMB-1 (10E)	na	na	C	8,760	NOX	---	---	0.44	1.91	Gas	AP-42								
								<b>6.4 MMBtu/hr Thermal Oxidizer 01 (COMB-1 (10E))</b>							CO	---	---	1.99	8.71	Gas	AP-42	
								VOC	---	---	---	---	Gas	AP-42								
								SO2	---	---	3.8E-03	0.02	Gas	AP-42								
								PM10/2.5	---	---	0.05	0.21	Solid/Gas	AP-42								
								Benzene	---	---	---	---	Gas	---								
								Ethylbenzene	---	---	---	---	Gas	---								
								HCHO	---	---	4.7E-04	2.1E-03	Gas	AP-42								
								n-Hexane	---	---	---	---	Gas	---								
								Methanol	---	---	---	---	Gas	---								
								Toluene	---	---	---	---	Gas	---								
								2,2,4-TMP	---	---	---	---	Gas	---								
								Xylenes	---	---	---	---	Gas	---								
								Other HAP	---	---	1.2E-05	5.2E-05	Gas	AP-42								
								Total HAP	---	---	4.8E-04	2.1E-03	Gas	Sum								
								CO	---	---	754	3,304	Gas	AP-42								
								CH4	---	---	---	---	Gas	---								
								N2O	---	---	0.01	0.06	Gas	AP-42								
CO2e	---	---	758	3,322	Gas	Wgt Sum																

Continued ...



**CONNER COMPRESSOR STATION**

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**Attachment J - Emission Points Data Summary Sheet**

**Heater Treater**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )	
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr				
HTR-01 (11E)	Upward Vertical	<b>1.55 MMBtu/hr Heater Treater (HTR-01 (11E))</b>						8,760	NOX	0.15	0.67	0.15	0.67	Gas	AP-42	
		CO	0.13	0.56	0.13	0.56	Gas		AP-42							
		VOC	0.01	0.04	0.01	0.04	Gas		AP-42							
		SO2	9.1E-04	4.0E-03	9.1E-04	4.0E-03	Gas		AP-42							
		PM10/2.5	0.01	0.05	0.01	0.05	Solid/Gas		AP-42							
		Benzene	3.2E-06	1.4E-05	3.2E-06	1.4E-05	Gas		AP-42							
		Ethylbenzene	---	---	---	---	Gas		---							
		HCHO	1.1E-04	5.0E-04	1.1E-04	5.0E-04	Gas		AP-42							
		n-Hexane	2.7E-03	0.01	2.7E-03	0.01	Gas		AP-42							
		Methanol	---	---	---	---	Gas		---							
		Toluene	5.2E-06	2.3E-05	5.2E-06	2.3E-05	Gas		AP-42							
		2,2,4-TMP	---	---	---	---	Gas		---							
		Xylenes	---	---	---	---	Gas		---							
		Other HAP	2.9E-06	1.3E-05	2.9E-06	1.3E-05	Gas		AP-42							
		Total HAP	2.9E-03	0.01	2.9E-03	0.01	Gas		Sum							
		CO	183	800	183	800	Gas		AP-42							
		CH4	3.5E-03	0.02	3.5E-03	0.02	Gas		AP-42							
		N2O	3.3E-03	0.01	3.3E-03	0.01	Gas		AP-42							
CO2e	184	805	184	805	Gas	Wgt Sum										

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Condensate Stabilizer Heater 01**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
HTR-02 (12E)	Upward Vertical	2.55 MMBtu/hr Condensate Stabilizer Heater 01 (HTR-02 (12E))		na	na	C	8,760	NOX	0.25	1.10	0.25	1.10	Gas	AP-42	
								CO	0.21	0.92	0.21	0.92	Gas	AP-42	
		VOC	0.01					0.06	0.01	0.06	Gas	AP-42			
		SO2	1.5E-03					6.6E-03	1.5E-03	6.6E-03	Gas	AP-42			
		PM10/2.5	0.02					0.08	0.02	0.08	Solid/Gas	AP-42			
		Benzene	5.3E-06					2.3E-05	5.3E-06	2.3E-05	Gas	AP-42			
		Ethylbenzene	---					---	---	---	Gas	---			
		HCHO	1.9E-04					8.2E-04	1.9E-04	8.2E-04	Gas	AP-42			
		n-Hexane	4.5E-03					0.02	4.5E-03	0.02	Gas	AP-42			
		Methanol	---					---	---	---	Gas	---			
		Toluene	8.5E-06					3.7E-05	8.5E-06	3.7E-05	Gas	AP-42			
		2,2,4-TMP	---					---	---	---	Gas	---			
		Xylenes	---					---	---	---	Gas	---			
		Other HAP	4.7E-06					2.1E-05	4.7E-06	2.1E-05	Gas	AP-42			
		Total HAP	4.7E-03					0.02	4.7E-03	0.02	Gas	Sum			
		CO	300					1,314	300	1,314	Gas	AP-42			
		CH4	5.8E-03					0.03	5.8E-03	0.03	Gas	AP-42			
N2O	5.5E-03	0.02	5.5E-03	0.02	Gas	AP-42									
CO2e	302	1,322	302	1,322	Gas	Wgt Sum									

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Station Recycle Line Heater**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
HTR-03 (19E)	Upward Vertical	HTR-03 (19E)	HTR-03 (19E)	na	na	C	8,760	NOX	0.16	0.71	0.16	0.71	Gas	AP-42	
								CO	0.14	0.60	0.14	0.60	Gas	AP-42	
								VOC	0.01	0.04	0.01	0.04	Gas	AP-42	
								SO2	9.8E-04	4.3E-03	9.8E-04	4.3E-03	Gas	AP-42	
								PM10/2.5	0.01	0.05	0.01	0.05	Solid/Gas	AP-42	
								Benzene	3.4E-06	1.5E-05	3.4E-06	1.5E-05	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	---	
								HCHO	1.2E-04	5.4E-04	1.2E-04	5.4E-04	Gas	AP-42	
								n-Hexane	2.9E-03	0.01	2.9E-03	0.01	Gas	AP-42	
								Methanol	---	---	---	---	Gas	---	
								Toluene	5.5E-06	2.4E-05	5.5E-06	2.4E-05	Gas	AP-42	
								2,2,4-TMP	---	---	---	---	Gas	---	
								Xylenes	---	---	---	---	Gas	---	
								Other HAP	3.1E-06	1.4E-05	3.1E-06	1.4E-05	Gas	AP-42	
								Total HAP	3.1E-03	0.01	3.1E-03	0.01	Gas	Sum	
								CO	196	857	196	857	Gas	AP-42	
								CH4	3.8E-03	0.02	3.8E-03	0.02	Gas	AP-42	
								N2O	3.6E-03	0.02	3.6E-03	0.02	Gas	AP-42	
CO2e	197	862	197	862	Gas	Wgt Sum									
<b>1.66 MMBtu/hr - Station Recycle Line Heater (HTR-03 (19E))</b>															

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Condensate Stabilizer Heater 02**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )							
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr										
HTR-04 (20E)	Upward Vertical	HTR-04 (20E)	HTR-04 (20E)	na	na	C	8,760	NOX	0.95	4.17	0.95	4.17	Gas	AP-42								
								<b>9.7 MMBtu/hr Condensate Stabilizer Heater 02 (HTR-04 (20E))</b>							CO	0.80	3.50	0.80	3.50	Gas	AP-42	
								VOC	0.05	0.24	0.05	0.24	Gas	AP-42								
								SO2	5.7E-03	2.5E-02	5.7E-03	2.5E-02	Gas	AP-42								
								PM10/2.5	0.07	0.32	0.07	0.32	Solid/Gas	AP-42								
								Benzene	2.0E-05	8.7E-05	2.0E-05	8.7E-05	Gas	AP-42								
								Ethylbenzene	---	---	---	---	Gas	---								
								HCHO	7.1E-04	3.1E-03	7.1E-04	3.1E-03	Gas	AP-42								
								n-Hexane	1.7E-02	0.07	1.7E-02	0.07	Gas	AP-42								
								Methanol	---	---	---	---	Gas	---								
								Toluene	3.2E-05	1.4E-04	3.2E-05	1.4E-04	Gas	AP-42								
								2,2,4-TMP	---	---	---	---	Gas	---								
								Xylenes	---	---	---	---	Gas	---								
								Other HAP	1.8E-05	7.9E-05	1.8E-05	7.9E-05	Gas	AP-42								
								Total HAP	1.8E-02	0.08	1.8E-02	0.08	Gas	Sum								
								CO	1,141	4,999	1,141	4,999	Gas	AP-42								
								CH4	2.2E-02	0.10	2.2E-02	0.10	Gas	AP-42								
N2O	2.1E-02	0.09	2.1E-02	0.09	Gas	AP-42																
CO2e	1,148	5,029	1,148	5,029	Gas	Wgt Sum																

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Produced Water Storage Tank**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
T01 (13E)	Upward Vertical	T01 (13E)	T01 (13E)	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	0.03	0.14	0.03	0.14	Gas	EPA	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	1.6E-03	7.0E-03	1.6E-03	7.0E-03	Gas	EPA	
								Ethylbenzene	1.6E-03	7.0E-03	1.6E-03	7.0E-03	Gas	EPA	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	1.6E-03	0.01	1.6E-03	0.01	Gas	EPA	
								Methanol	---	---	---	---	Gas	---	
								Toluene	1.6E-03	7.0E-03	1.6E-03	7.0E-03	Gas	EPA	
								2,2,4-TMP	1.6E-03	7.0E-03	1.6E-03	7.0E-03	Gas	EPA	
								Xylenes	1.6E-03	7.0E-03	1.6E-03	7.0E-03	Gas	EPA	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	9.6E-03	0.04	9.6E-03	0.04	Gas	---	
								CO	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
N2O	---	---	---	---	Gas	---									
CO2e	---	---	---	---	Gas	---									

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Produced Water - Truck Load-Out 01**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
TLO-01 (14E)	Upward Vertical	TLO-01 (14E)	TLO-01 (14E)	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	---	0.45	---	0.45	Gas	AP-42	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	2.2E-02	---	2.2E-02	Gas	AP-42	
								Ethylbenzene	---	2.2E-02	---	2.2E-02	Gas	AP-42	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	0.02	---	0.02	Gas	AP-42	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	2.2E-02	---	2.2E-02	Gas	AP-42	
								2,2,4-TMP	---	2.2E-02	---	2.2E-02	Gas	AP-42	
								Xylenes	---	2.2E-02	---	2.2E-02	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	0.13	---	0.13	Gas	Sum	
								CO	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
N2O	---	---	---	---	Gas	---									
CO2e	---	---	---	---	Gas	---									

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Condensate - Truck Load-Out 02**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
TLO-02 (15E)	Upward Vertical	TLO-02 (15E)	TLO-02 (15E)	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	---	2.47	---	2.47	Gas	AP-42	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	3.5E-02	---	3.5E-02	Gas	AP-42	
								Ethylbenzene	---	3.5E-02	---	3.5E-02	Gas	AP-42	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	0.03	---	0.03	Gas	AP-42	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	3.5E-02	---	3.5E-02	Gas	AP-42	
								2,2,4-TMP	---	3.5E-02	---	3.5E-02	Gas	AP-42	
								Xylenes	---	3.5E-02	---	3.5E-02	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	0.21	---	0.21	Gas	Sum	
								CO	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
N2O	---	---	---	---	Gas	---									
CO2e	---	---	---	---	Gas	---									

Continued ...

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**Produced Water Storage Tank**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
T02 (21E)	Upward Vertical	T02 (21E)	T02 (21E)	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	0.14	0.62	0.14	0.62	Gas	EPA	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								Ethylbenzene	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								Methanol	---	---	---	---	Gas	---	
								Toluene	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								2,2,4-TMP	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								Xylenes	7.0E-03	0.03	7.0E-03	0.03	Gas	EPA	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	0.04	0.18	0.04	0.18	Gas	---	
								CO	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
N2O	---	---	---	---	Gas	---									
CO2e	---	---	---	---	Gas	---									

Continued ...



**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment J - Emission Points Data Summary Sheet**

**FACILITY-WIDE SUMMARY**

**Table 1: Emissions Data - Continued**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	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 <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
na	na	na	na	na	na	na	na	NOX	11.71	51.31	5.53	24.20	Gas	Sum	
								CO	27.12	119	5.43	23.78	Gas	Sum	
								Point - VOC	236.72	1,083	10.13	89.52	Gas	Sum	
								Fugitive - VOC	9.12	39.93	9.12	39.93	Gas	Sum	
								Total - VOC	245.69	1,122	19.11	129.45	Gas	Sum	
								SO2	0.03	0.11	0.03	0.13	Gas	Sum	
								PM10/2.5	0.40	1.77	0.45	1.98	Solid/Gas	Sum	
								Benzene	4.11	18.09	0.20	0.94	Gas	Sum	
								Ethylbenzene	4.26	18.75	0.20	0.93	Gas	Sum	
								HCHO	2.30	10.08	0.64	2.82	Gas	Sum	
								n-Hexane	4.86	22.45	0.24	2.19	Gas	Sum	
								Methanol	0.06	0.27	0.01	0.05	Gas	Sum	
								Toluene	18.22	79.96	0.34	1.62	Gas	Sum	
								2,2,4-TMP	3.58	16.26	0.19	1.42	Gas	Sum	
								Xylenes	38.05	167	0.53	2.52	Gas	Sum	
								Other HAP	0.34	1.49	0.04	0.19	Gas	Sum	
								Total HAP	76.02	335	2.38	12.68	Gas	Sum	
CO2	5,634	24,678	6,388	27,982	Gas	Sum									
CH4	80.11	426	35.28	229.95	Gas	Sum									
N2O	0.05	0.20	0.06	0.26	Gas	Sum									
CO2e	7,650	35,395	7,288	33,808	Gas	Sum									

**FACILITY-WIDE SUMMARY  
(Including Fugitives (FUG-G and FUG-L (17E))**

Continued ...

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment J - Emission Points Data Summary Sheet**

**Table 1 Notes**

Criteria Pollutants	
Pollutant	CAS
NO2	10102-44-0
CO	630-08-0
VOC	na
Propane	74-98-6
i-Butane	75-28-5
n-Butane	106-97-8
SO2	7446-09-5
PM10/2.5	na

Hazardous Air Pollutants (HAPs)	
Pollutant	CAS
Benzene	71-43-2
Ethylbenzene	100-41-4
Formaldehyde	50-00-0
n-Hexane	110-54-3
Methanol	67-56-1
Toluene	108-88-3
2,2,4-TMP	540-84-1
Xylenes	1330-20-7
Other HAP	na
Total HAP	na

Greenhouse Gas (GHG) Pollutants	
Pollutant	CAS
CO2	124-38-9
CH4	74-82-8
N2O	10024-97-2
CO2e	na

**Table 1: Notes**

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

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



**ATTACHMENT K**  
**Fugitive Emissions Data Summary Sheet**

---

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

---

- **Application Forms Checklist**
  - **Fugitive Emissions Summary**
  - **Leak Source Data Sheet**
-

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit  
**Attachment K - Fugitive Emissions**

**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 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, then complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.

3.) Will there be Liquid Loading/Unloading Operations?

Yes       No

--- Included in Point Source Emissions ---

If Yes, then 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, then 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, then 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, then complete the GENERAL EMISSIONS UNIT DATA SHEET.

7.) Will there be any other activities that generate fugitive emissions?

Yes       No

If Yes, then 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."

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment K - Fugitive Emissions**

**FUGITIVE EMISSIONS DATA SUMMARY SHEET - Continued**

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 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.

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS <sup>1</sup>	Maximum Potential Pre-Controlled Emissions <sup>2</sup>		Maximum Potential Controlled Emissions <sup>3</sup>		Est. Method Used <sup>4</sup>
		lb/hr	ton/yr	lb/hr	ton/yr	
Paved Haul Roads	na	---	---	---	---	---
Unpaved Haul Roads	na	---	---	---	---	---
Storage Pile Emissions	na	---	---	---	---	---
<b>Loading/Unloading Operations</b>	<b>--- Included in Point Source Emissions ---</b>					
Wastewater Treatment	na	---	---	---	---	---
<b>Equipment Leaks (FUG-G and FUG-L (17E) (Total)</b>	<b>VOC</b>	<b>9.12</b>	<b>39.93</b>	<b>9.12</b>	<b>39.93</b>	<b>AP-42</b>
	<b>Benzene</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>E-Benzene</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>Formaldehyde (HCHO)</b>	---	---	---	---	---
	<b>n-Hexane</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>Methanol (MeOH)</b>	---	---	---	---	---
	<b>Toluene</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>2,2,4-TMP</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>Xylenes</b>	<b>0.11</b>	<b>0.48</b>	<b>0.11</b>	<b>0.48</b>	<b>AP-42</b>
	<b>Other HAP</b>	---	---	---	---	---
	<b>Total HAP</b>	<b>0.65</b>	<b>2.86</b>	<b>0.65</b>	<b>2.86</b>	<b>Sum</b>
	<b>CO2</b>	<b>0.04</b>	<b>0.16</b>	<b>0.04</b>	<b>0.16</b>	<b>AP-42</b>
	<b>CH4</b>	<b>7.91</b>	<b>34.63</b>	<b>7.91</b>	<b>34.63</b>	<b>AP-42</b>
	<b>N2O</b>	---	---	---	---	---
	<b>CO2e</b>	<b>198</b>	<b>866</b>	<b>198</b>	<b>866</b>	<b>Wgt Sum</b>
General Clean-up VOC Emissions	na	---	---	---	---	---
Other	na	---	---	---	---	---

<sup>1</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases, etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

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

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

<sup>4</sup> 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).

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment K - Fugitive Emissions**

**DESCRIPTION OF FUGITIVE EMISSIONS**

Source Category	Pollutant	Number of Source Components <sup>1</sup>	Number of Components Monitored by Frequency <sup>2</sup>	Average Time to Repair (Days) <sup>3</sup>	Estimated Annual Emission Rate (lb/yr) <sup>4</sup>
Pumps <sup>5</sup>	Light Liquid VOC <sup>6,7</sup>				
	Heavy Liquid VOC <sup>8</sup>				
	Non-VOC <sup>9</sup>				
Valves <sup>10</sup>	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves <sup>11</sup>	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Open Ended Lines <sup>12</sup>	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Sampling Connections <sup>13</sup>	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Compressors	Gas VOC				
	Non-VOC				
Flanges / Connectors	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Other*	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
<b>TOTAL (lb/yr)</b>					<b>79,850</b>
<b>TOTAL (tpy)</b>					<b>39.93</b>

**This Facility is NOT Subject to Leak Detection and Repair (LDAR) Regulations. Please Reference the Fugitive Emissions Summary Data Sheet .**

\*Other components include compressor seals, relief valves, diaphragms, drains, meters, etc.

**Attachment K**  
**DESCRIPTION OF FUGITIVE EMISSIONS - Continued**

**Notes for Leak Source Data Sheet**

1. For VOC sources include components on streams and equipment that contain greater than 10% VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.
2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in visual or soap-bubble leak detection ppm. Do not include monitoring by methods. "M/Q(M)/Q/SA/A/0" means the time period between inspections as follows:  
Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/other (specify time period)  
  
If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category valves, gas service: 0/50/0/75/0/50 (bimonthly).
3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.
4. Note the method used: MB - material balance; EPA - emission factors established by EPA (cite document used);  
EE - engineering estimate; 0 - other method, such as in-house emission factor (specify).
5. Do not include in the equipment count seal-less pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
6. Volatile organic compounds (VOC) means the term as defined in 40 CFR. 51.100 (s).
7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a light liquid.
8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C. then the fluid is defined as a heavy liquid.
9. LIST CO, H2S, mineral acids, NO, SO, etc. DO NOT LIST H, H2O, N, O, and Noble Gases.
10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
13. Do not include closed-purge sampling connections.



## **ATTACHMENT L**

### **Emissions Unit Data Sheet(s)**

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“28. Fill out the **Emissions Unit Data Sheet(s)** as Attachment L.”

---

- **NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET**
    - 1,380 bhp Caterpillar G3516B (4SLB) Compressor Engine – Vendor Data
    - 203 bhp Caterpillar G3306TA (4SRB) Compressor Engine – Vendor Data
  - **DISPERSION STACK VENDOR DATA**
  - **NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET**
    - Glycol Dehydration Units – 60.0 MMscfd GRI-GLYCalc
      - Summary of Emissions
      - Summary of Input Values
      - Aggregate Calculations Report
    - 40 CFR Part 63; Subpart HH & HHH Registration Forms
  - **NATURAL GAS FIRED BOILER/LINE HEATER DATA SHEET**
  - **STORAGE TANK DATA SHEET**
  - **EMISSIONS UNIT DATA SHEETS STORAGE TANKS**
    - ProMax Summary
  - **EMISSIONS UNIT DATA SHEET BULK LIQUID TRANSFER OPERATIONS**
-

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment L - Emission Unit Data Sheet****NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET**

Compressor Station		Conner CS		Conner CS		Conner CS	
Source Identification Number <sup>1</sup>		CE-01 (1E)		CE-02 (2E)		CE-03 (3E)	
Engine Manufacturer and Model		CAT G3516B		CAT G3516B		CAT G3306B TA	
Manufacturer's Rated bhp/rpm		1,380 / 1,400		1,380 / 1,400		203 / 1,800	
Source Status <sup>2</sup>		ES		ES		ES	
Date Installed/Modified/Removed <sup>3</sup>		February 2015		February 2015		February 2015	
Manufactured/Reconstruction Date <sup>4</sup>		After August 2011		After August 2011		After August 2011	
Certified Engine (40CFR60 NSPS JJJJ) <sup>5</sup>		No		No		No	
Engine, Fuel and Combustion Data	Engine Type <sup>6</sup>	LB4S		LB4S		RB4S	
	APCD Type <sup>7</sup>	OxCat		OxCat		NSCR	
	Fuel Type <sup>8</sup>	RG		RG		RG	
	H <sub>2</sub> S (gr/100 scf)	0.2		0.2		0.2	
	Operating bhp/rpm	1,380 / 1,400		1,380 / 1,400		203 / 1,800	
	BSFC (Btu/bhp-hr)	7,442		7,442		8,240	
	Fuel (ft <sup>3</sup> /hr)	11,163		11,163		1,818	
	Fuel (MMft <sup>3</sup> /yr)	97.79		97.79		15.93	
	Operation (hrs/yr)	8,760		8,760		8,760	
Reference <sup>9</sup>	PTE <sup>10</sup>	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NOx	1.52	6.66	1.52	6.66	0.20	0.90
MD	CO	0.50	2.20	0.50	2.20	0.89	3.89
MD	VOC	0.56	2.47	0.56	2.47	0.20	0.86
AP	SOx	0.01	0.03	0.01	0.03	1.1E-03	4.8E-03
AP	PM10/2.5	0.11	0.50	0.11	0.50	0.04	0.16
AP	Benzene	4.6E-04	2.0E-03	4.6E-04	2.0E-03	2.9E-03	0.01
AP	Ehtylbenzene	4.2E-05	1.8E-04	4.2E-05	1.8E-04	4.6E-05	2.0E-04
MD	Formaldehyde	0.27	1.17	0.27	1.17	0.09	0.39
AP	n-Hexane	1.2E-03	0.01	1.2E-03	0.01	---	---
AP	Methanol	2.6E-03	0.01	2.6E-03	0.01	0.01	0.02
AP	Toluene	4.3E-04	1.9E-03	4.3E-04	1.9E-03	1.0E-03	4.5E-03
AP	2,2,4-TMP	2.6E-04	1.2E-03	2.6E-04	1.2E-03	---	---
AP	Xylene	1.9E-04	8.5E-04	1.9E-04	8.5E-04	3.6E-04	1.6E-03
AP	Other HAP	0.02	0.07	0.02	0.07	0.01	0.05
Sum	Total HAP	0.29	1.26	0.29	1.26	0.11	0.49
MD	CO <sub>2</sub>	1,570	6,876	1,570	6,876	254	1,113
MD	CH <sub>4</sub>	5.99	26.25	5.99	26.25	0.19	0.84
AP	N <sub>2</sub> O	2.5E-03	0.01	2.5E-03	0.01	4.1E-04	1.8E-03
Weighted Sum	CO <sub>2e</sub>	1,720	7,536	1,720	7,536	259	1,135

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit  
**Attachment L - Emission Unit Data Sheet**

**NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET**  
(Continued)

Notes to **NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET**

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.
  2. Enter the Source Status using the following codes:
    - NS = Construction of New Source (installation)
    - ES = Existing Source
    - MS = Modification of Existing Source
    - RS = Removal of Source
  3. Enter the date (or anticipated date) of the engine's installation (construction of source), modification or removal.
  4. Enter the date that the engine was manufactured, modified or reconstructed.
  5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.
- Provide a manufacturer's data sheet for all engines being registered.**
6. Enter the Engine Type designation(s) using the following codes:
    - LB2S = Lean Burn Two Stroke
    - RB4S = Rich Burn Four Stroke
    - LB4S = Lean Burn Four Stroke
  7. Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:
    - A/F = Air/Fuel Ratio
    - IR = Ignition Retard
    - HEIS = High Energy Ignition System
    - SIPC = Screw-in Precombustion Chambers
    - PSC = Prestratified Charge
    - LEC = Low Emission Combustion
    - NSCR = Non-Selective Catalytic Reduction
    - SCR = Lean Burn & Selective Catalytic Reduction
  8. Enter the Fuel Type using the following codes:
    - PQ = Pipeline Quality Natural Gas
    - RG = Raw Natural Gas
  9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this Compressor/Generator Data Sheet(s).
    - MD = Manufacturer's Data
    - AP = AP-42
    - GR = GRI-HAPCalcTM
    - OT = Other (please list) \_\_\_\_\_
  10. Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the Emissions Summary Sheet.

ENGINE SPEED (rpm): 1400  
 COMPRESSION RATIO: 8:1  
 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  
 IGNITION SYSTEM: ADEM3  
 EXHAUST MANIFOLD: DRY  
 COMBUSTION: Ultra Lean Burn  
 NOX EMISSION LEVEL (g/bhp-hr NOx): 0.5  
 SET POINT TIMING: 28

FUEL SYSTEM:  
**SITE CONDITIONS:**  
 FUEL:  
 FUEL PRESSURE RANGE(psig):  
 FUEL METHANE NUMBER:  
 FUEL LHV (Btu/scf):  
 ALTITUDE(ft):  
 MAXIMUM INLET AIR TEMPERATURE(°F):  
 STANDARD RATED POWER:

CAT WIDE RANGE  
 WITH AIR FUEL RATIO CONTROL  
 Gas Analysis  
 7.0-50.0  
 50.5  
 1170  
 1311  
 100  
 1380 bhp@1400rpm

RATING	NOTES	LOAD	MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
			100%	100%	75%	50%
ENGINE POWER (WITHOUT FAN)	(1)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE		°F	100	100	100	100

ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7415	7415	7942	8530
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8171	8171	8751	9400
AIR FLOW (77°F, 14.7 psia) (WET)	(3)(4)	scfm	3147	3147	2469	1726
AIR FLOW (WET)	(3)(4)	lb/hr	13954	13954	10946	7653
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	92.8	92.8	75.4	53.0
EXHAUST TEMPERATURE - ENGINE OUTLET	(6)	°F	1016	1016	1009	1029
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(7)(4)	ft3/min	9268	9268	7248	5142
EXHAUST GAS MASS FLOW (WET)	(7)(4)	lb/hr	14445	14445	11341	7935

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	3.02	3.02	3.24	3.18
THC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	4.29	4.29	4.59	4.66
NMHC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	1.95	1.95	2.09	2.12
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)(10)	g/bhp-hr	0.94	0.94	1.01	1.03
HCHO (Formaldehyde)	(8)(9)	g/bhp-hr	0.38	0.38	0.37	0.37
CO2	(8)(9)	g/bhp-hr	516	516	550	598
EXHAUST OXYGEN	(8)(11)	% DRY	9.1	9.1	8.8	8.4

HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(12)	Btu/min	21892	21892	20445	19118
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	12060	12060	9999	3481
HEAT REJ. TO A/C - STAGE 2 (2AC)	(12)(13)	Btu/min	5601	5601	5265	3419

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	42114
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5881
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

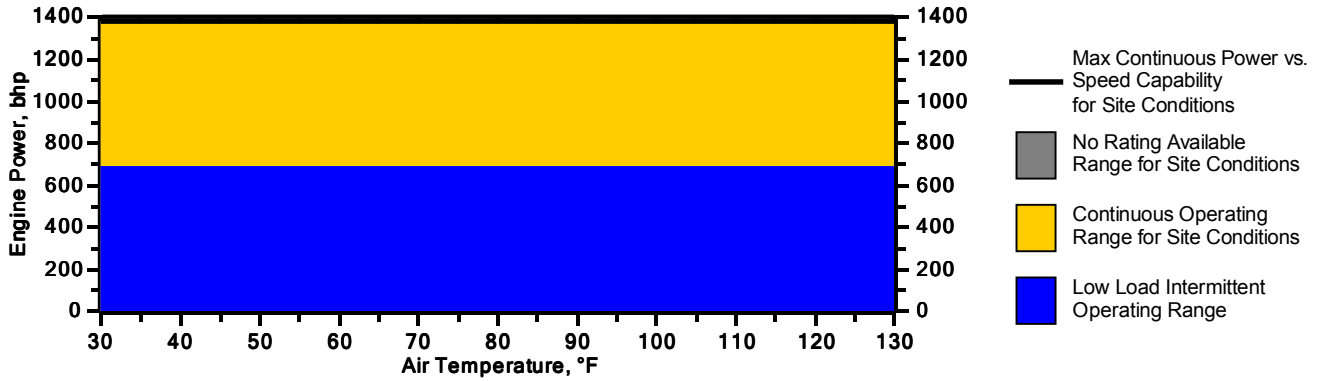
**CONDITIONS AND DEFINITIONS**

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. Max. rating is the maximum capability 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.

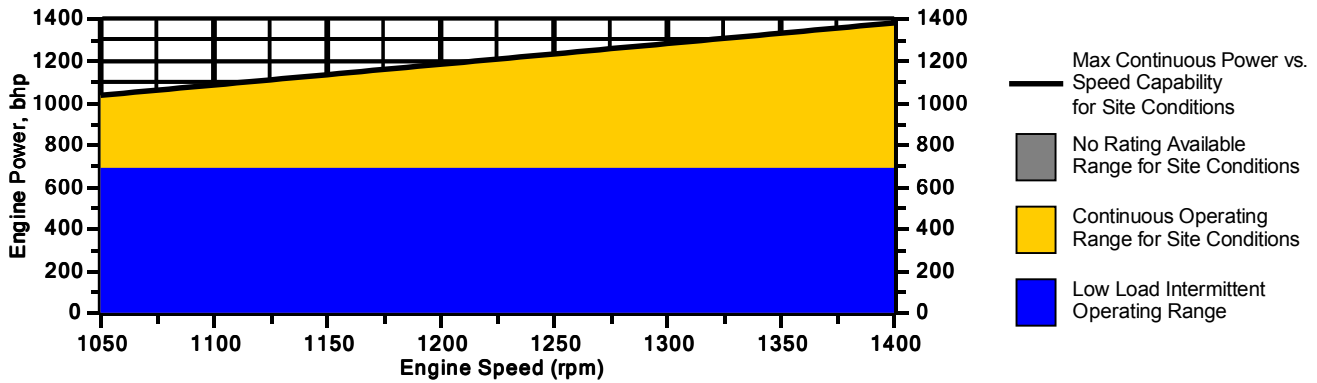
**Engine Power vs. Inlet Air Temperature**

Data represents temperature sweep at 1311 ft and 1400 rpm



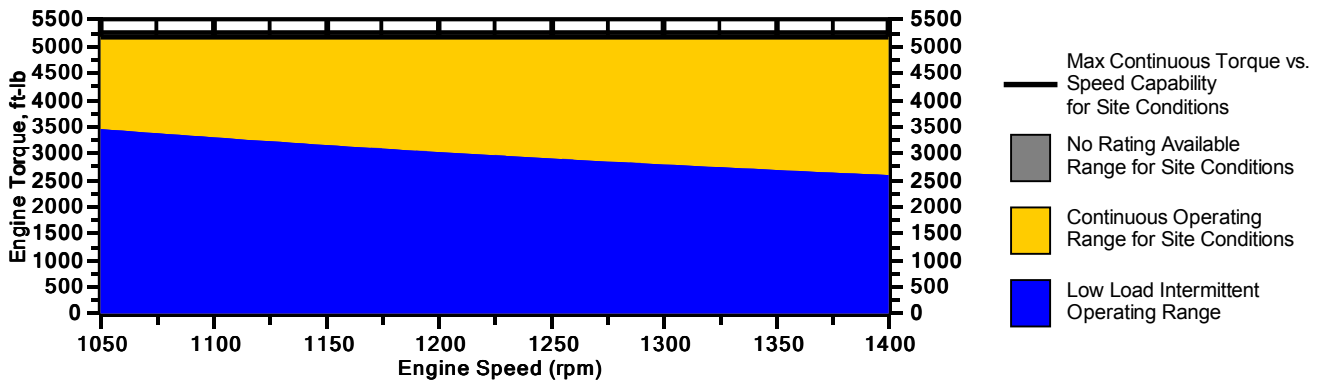
**Engine Power vs. Engine Speed**

Data represents speed sweep at 1311 ft and 100 °F



**Engine Torque vs. Engine Speed**

Data represents speed sweep at 1311 ft and 100 °F



Note: At site conditions of 1311 ft and 100°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

### **NOTES**

1. Engine rating is with two engine driven water pumps. Tolerance is  $\pm 3\%$  of full load.
2. Fuel consumption tolerance is  $\pm 3.0\%$  of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of  $\pm 5\%$ .
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  $\pm 5\%$ .
6. Exhaust temperature is a nominal value with a tolerance of  $(+)63^{\circ}\text{F}$ ,  $(-)54^{\circ}\text{F}$ .
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of  $\pm 6\%$ .
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  $\pm 3$ . 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  $\pm 0.5$ .
12. Heat rejection values are nominal. Tolerances, based on treated water, are  $\pm 10\%$  for jacket water circuit,  $\pm 50\%$  for radiation,  $\pm 20\%$  for lube oil circuit, and  $\pm 5\%$  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.

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	HPG IMPCO
AFTERCOOLER WATER INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	210		
ASPIRATION:	TA	<b>SITE CONDITIONS:</b>	
COOLING SYSTEM:	JW+OC, AC	FUEL:	OVm Gas
CONTROL SYSTEM:	ADEM4	FUEL PRESSURE RANGE (psig):	12.0-24.9
EXHAUST MANIFOLD:	WC	FUEL METHANE NUMBER:	38.7
COMBUSTION:	CATALYST SETTING	FUEL LHV (Btu/scf):	1227
EXHAUST OXYGEN (% O2):	0.3	ALTITUDE(ft):	1000
SET POINT TIMING:	22	MAXIMUM INLET AIR TEMPERATURE(°F):	77
		STANDARD RATED POWER:	203 bhp@1800rpm

RATING	NOTES	LOAD	MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
			100%	100%	75%	50%
ENGINE POWER (WITHOUT FAN)	(1)	bhp	202	202	152	101
INLET AIR TEMPERATURE		°F	77	77	77	77

ENGINE DATA							
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	8240	8240	8618	9467	
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	9070	9070	9486	10420	
AIR FLOW (@inlet air temp, 14.7 psia)	(3)(4)	ft <sup>3</sup> /min	295	295	239	177	(WET)
AIR FLOW	(3)(4)	lb/hr	1307	1307	1058	783	(WET)
FUEL FLOW (60°F, 14.7 psia)		scfm	23	23	18	13	
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	38.2	38.2	31.1	23.7	
EXHAUST TEMPERATURE - ENGINE OUTLET	(6)	°F	1160	1160	1118	1048	
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(7)(4)	ft <sup>3</sup> /min	990	990	778	550	(WET)
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	1387	1387	1121	830	(WET)

EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)	(8)(9)	g/bhp-hr	15.26	15.26	15.75	13.98	
CO	(8)(9)	g/bhp-hr	15.26	15.26	15.76	13.98	
THC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.87	0.87	0.91	1.24	
NMHC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.44	0.44	0.46	0.63	
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)(10)	g/bhp-hr	0.24	0.24	0.25	0.34	
HCHO (Formaldehyde)	(8)(9)	g/bhp-hr	0.20	0.20	0.20	0.21	
CO2	(8)(9)	g/bhp-hr	568	568	608	672	
EXHAUST OXYGEN	(8)(11)	% DRY	0.3	0.3	0.3	0.3	

HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)	(12)	Btu/min	9110	9110	7602	6263	
HEAT REJ. TO ATMOSPHERE	(12)	Btu/min	1112	1112	872	640	
HEAT REJ. TO LUBE OIL (OC)	(12)	Btu/min	1359	1359	1134	934	
HEAT REJ. TO AFTERCOOLER (AC)	(12)(13)	Btu/min	539	539	270	71	

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC)	(13)	Btu/min	11652
TOTAL AFTERCOOLER CIRCUIT (AC)	(13)(14)	Btu/min	566
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

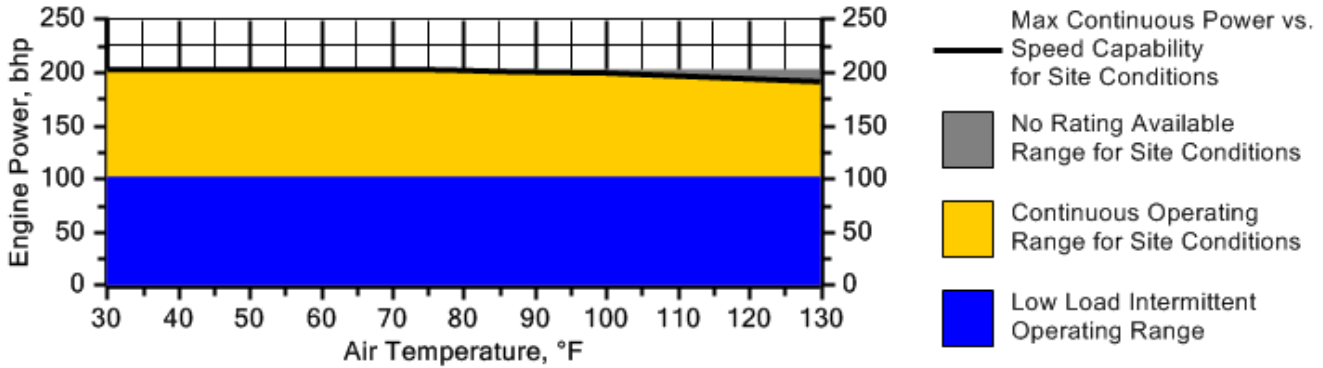
**CONDITIONS AND DEFINITIONS**

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. Max. rating is the maximum capability 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.

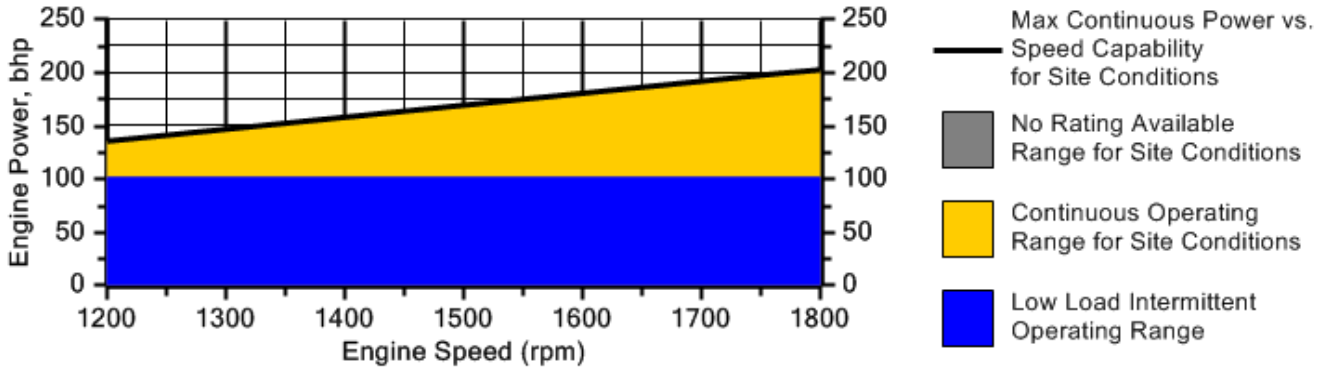
### Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1000 ft and 1800 rpm



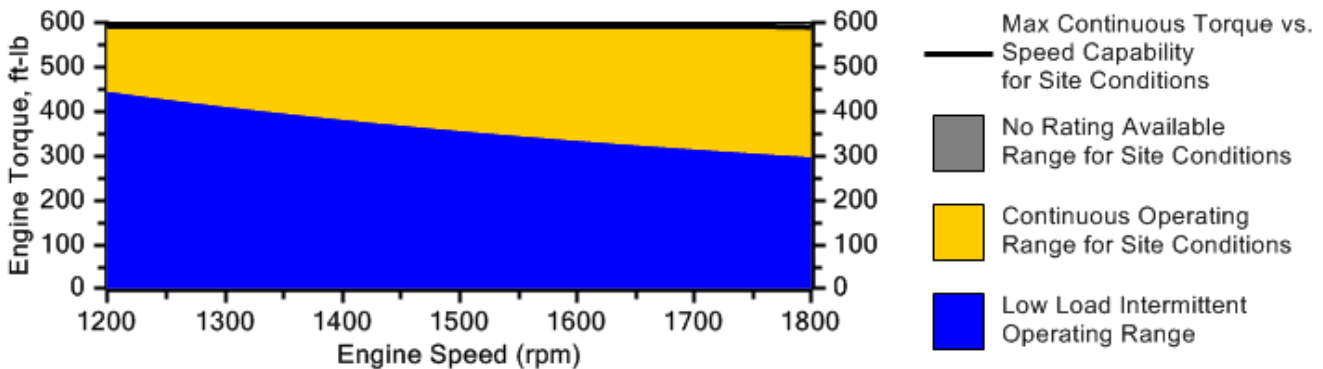
### Engine Power vs. Engine Speed

Data represents speed sweep at 1000 ft and 77 °F



### Engine Torque vs. Engine Speed

Data represents speed sweep at 1000 ft and 77 °F



Note: At site conditions of 1000 ft and 77°F inlet air temp., constant torque can be maintained down to 1200 rpm. The minimum speed for loading at these conditions is 1200 rpm.



**NOTES**

1. Engine rating is with two engine driven water pumps. Tolerance is  $\pm 3\%$  of full load.
2. Fuel consumption tolerance is  $\pm 5.0\%$  of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of  $\pm 5\%$ .
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  $\pm 5\%$ .
6. Exhaust temperature is a nominal value with a tolerance of  $(+63^{\circ}\text{F}, -54^{\circ}\text{F})$ .
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of  $\pm 6\%$ .
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  $\pm 3$ . 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 tolerance is  $\pm 0.2$ .
12. Heat rejection values are nominal. Tolerances, based on treated water, are  $\pm 10\%$  for jacket water circuit,  $\pm 50\%$  for radiation,  $\pm 20\%$  for lube oil circuit, and  $\pm 5\%$  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	71.4260	71.4260
Ethane	C2H6	17.0270	17.0270
Propane	C3H8	6.8190	6.8190
Isobutane	iso-C4H10	0.7220	0.7220
Norbutane	nor-C4H10	1.9740	1.9740
Isopentane	iso-C5H12	0.3660	0.3660
Norpentane	nor-C5H12	0.5030	0.5030
Hexane	C6H14	0.2150	0.2150
Heptane	C7H16	0.1360	0.1360
Nitrogen	N2	0.4650	0.4650
Carbon Dioxide	CO2	0.1880	0.1880
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	0.1040	0.1040
Nonane	C9H20	0.0550	0.0550
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup: OVM Gas  
Unit of Measure: English

#### Calculated Fuel Properties

Caterpillar Methane Number: 38.7

Lower Heating Value (Btu/scf): 1227  
Higher Heating Value (Btu/scf): 1351  
WOBBE Index (Btu/scf): 1392

THC: Free Inert Ratio: 152.14  
Total % Inerts (% N2, CO2, He): 0.65%  
RPC (%) (To 905 Btu/scf Fuel): 100%

Compressibility Factor: 0.996  
Stoich A/F Ratio (Vol/Vol): 12.70  
Stoich A/F Ratio (Mass/Mass): 16.35  
Specific Gravity (Relative to Air): 0.777  
Specific Heat Constant (K): 1.271

#### 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.

**CONNER COMPRESSOR STATION**

Application for 45CSR13 NSR Modification Permit

**Attachment L - Emission Unit Data Sheet****NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET**

General Glycol Dehydration Unit Data		Manufacturer and Model		Frederick Logan Company, Inc.			
				Max Dry Gas Flow Rate (MMscf/day)		60.0	
				Design Heat Input (MMBtu/hr) - HHV		1.66	
				Design Type (DEG or TEG)		TEG	
				Source Status <sup>2</sup>		ES	
				Date Installed/Modified/Removed <sup>3</sup>		RSV-01 - February 2015 RSV-02 - tbd	
				Regenerator Still Vent APCD <sup>4</sup>		TO	
				Fuel HV (Btu/scf) - LHV		920	
				H <sub>2</sub> S Content (gr/100 scf)		0.2	
				Operation (hrs/yr)		8,760	
Source ID # <sup>1</sup>	Vent	Reference <sup>5</sup>	PTE <sup>6</sup>	lbs/hr	tons/yr		
RBV-1 (4E) RBV-2 (7E) (each)	Reboiler Vent	AP	NOX	0.16	0.71		
		AP	CO	0.14	0.60		
		AP	VOC	0.01	0.04		
		AP	SO2	9.8E-04	4.3E-03		
		AP	PM10/2.5	0.01	0.05		
		AP	Benzene	3.4E-06	1.5E-05		
		AP	Ethylbenzene	---	---		
		AP	HCHO	1.2E-04	5.4E-04		
		AP	n-Hexane	2.9E-03	0.01		
		AP	Methanol	---	---		
		AP	Toluene	5.5E-06	2.43E-05		
		AP	2,2,4-TMP	---	---		
		AP	Xylenes	---	---		
		AP	Other HAP	3.1E-06	1.36E-05		
		Sum	Total HAP	3.1E-03	0.01		
		AP	CO2	196	857		
		AP	CH4	3.8E-03	0.02		
AP	N2O	3.6E-03	0.02				
	Weighted Sum	CO2e	197	862			
Source ID # <sup>1</sup>	Vent	Reference <sup>5</sup>	PTE <sup>6</sup>	lbs/hr	tons/yr		
RSV-1 (5E+6E) RSV-2 (8E+9E) (each)	Regenerator Still Vent + Flash Tank Vent	GRI-GLYCalc	VOC	1.11	4.85		
		GRI-GLYCalc	Benzene	0.02	0.09		
		GRI-GLYCalc	Ethylbenzene	0.02	0.09		
		GRI-GLYCalc	n-Hexane	0.02	0.10		
		GRI-GLYCalc	Toluene	0.09	0.39		
		GRI-GLYCalc	2,2,4-TMP	0.02	0.07		
		GRI-GLYCalc	Xylenes	0.19	0.83		
		Sum	Tot HAP	0.36	1.57		
		GRI-GLYCalc	CH4	0.23	0.99		
		Weighted Sum	CO2e	6	25		

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit  
**Attachment L - Emission Unit Data Sheet**

**NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET**  
**(Continued)**

Notes to **NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET**

1. Enter the appropriate Source Identification Numbers for the glycol dehydration unit Reboiler Vent and glycol Regenerator Still Vent. The glycol dehydration unit Reboiler Vent and glycol Regenerator Still Vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Unit Data Sheet shall be completed for each, using Source Identification #s RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

2. Enter the Source Status using the following codes:

- NS = Construction of New Source
- ES = Existing Source
- MS = Modification of Existing Source
- RS = Removal of Source

3. Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.

4. Enter the Air Pollution Control Device (APCD) type designation using the following codes:

- NA = None
- CD = Condenser
- FL = Flare
- CC = Condenser/Combustion Combination
- TO = Thermal Oxidizer

5. Enter the Potential Emissions Data Reference designation using the following codes:

- MD = Manufacturer's Data
- AP = AP-42
- GR = GRI-GLYCalcTM
- OT = Other (please list): \_\_\_\_\_

6. Enter the Reboiler Vent and glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalcTM (Radian International LLC & Gas Research Institute). Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc Aggregate Calculations Report to this Glycol Dehydration Unit Data Sheet(s). This PTE data shall be incorporated in the Emissions Summary Sheet.

**Include a copy of the GRI-GLYCalcTM analysis. This includes a printout of the aggregate calculations report, which shall include emissions reports, equipment reports, and stream reports.**

**\*An explanation of input parameters and examples, when using GRI-GLYCalcTM is available on our website.**



# DISPERSION TIP SPECIFICATIONS: DS-12-RO - Sonic Tip for Stack

**CORONA**  
REF. NO:  
CP14.537  
May 30, 2014

PROCESS DATA		UTILITIES	
GAS STREAM		PILOT FUEL GAS	n/a
FLOW MAXIMUM	58 mmscfd	PURGE GAS	35 SCFH
FLOW MINIMUM	PURGE		
MOLECULAR WEIGHT		PILOTS	
TEMPERATURE	60 <sup>o</sup> F	QUANTITY	- TYPE -
INLET PRESSURE	20 psig	THERMOCOUPLES	n/a TYPE n/a
SMOKELESS CAPACITY	n/a		

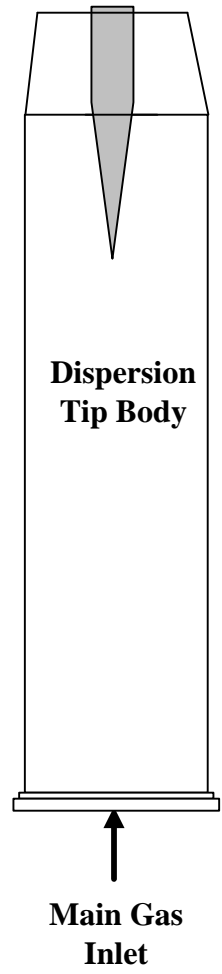
DIMENSIONS (approx.)			
HEIGHT	10' - 0"	WIDTH	1'-6"
WEIGHT	725 LBS		

MATERIALS	
UPPER BODY (5')	Carbon Steel
LOWER BODY (5')	Carbon Steel
PILOT	n/a
PILOT NOZZLE	n/a
LIFTING LUGS	Carbon Steel
PILOT MANIFOLD	n/a
IGNITION MANIFOLD	n/a
"AIR-LOCK" SEAL	Carbon Steel

NON DESTRUCTIVE EXAMINATION	
RADIOGRAPHY	10%
OTHER NDE	none

SURFACE FINISH / PAINT (carbon steel)	
SANDBLAST	SSPC SP-10
PRIMER	Sherwin Williams Macropoxy 646 (epoxy) 5-7 mils dft
TOP COAT	Sherwin Williams Fast clad DMT (urethane) (Forrest Green 4071)

TERMINAL POINTS		
GAS INLET	16"	Class 150 RFWN A-105
IGNITION INLET		
PILOT INLET		



*This offer may not include all items show.*

## GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Conner 60 MMscfd Dehy 13.7 gpm w/ 99% Emission Control  
 File Name: C:\projects2\wfs\OVM\Conner\Conner CS - NSR - 60 MMscfd DEHY - 10.29.13.ddf  
 Date: December 11, 2013

## DESCRIPTION:

-----  
 Description: Ext Gas Analysis for Caveney dated 09-23-09.  
 Inlet gas temp = 70F, pressure = 900 psig.  
 Electric Glycol Pump at 13.7 gpm max.  
 Thermal Oxidizer to control flash gas and  
 still vent streams.

Annual Hours of Operation: 8760.0 hours/yr

## WET GAS:

-----  
 Temperature: 70.00 deg. F  
 Pressure: 900.00 psig  
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
-----	-----
Carbon Dioxide	0.1880
Nitrogen	0.4650
Methane	71.4260
Ethane	17.0270
Propane	6.8190
Isobutane	0.7220
n-Butane	1.9740
Isopentane	0.3660
n-Pentane	0.5030
n-Hexane	0.1020
Cyclohexane	0.0140
Other Hexanes	0.0890
Heptanes	0.1360
Benzene	0.0020
Toluene	0.0060
Ethylbenzene	0.0010
Xylenes	0.0070
C8+ Heavies	0.1535

## DRY GAS:

-----  
 Flow Rate: 60.0 MMSCF/day  
 Water Content: 7.0 lbs. H2O/MMSCF

## LEAN GLYCOL:

-----  
 Glycol Type: TEG  
 Water Content: 1.5 wt% H2O  
 Flow Rate: 13.7 gpm

## PUMP:

-----

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

---

Flash Control: Combustion device  
Flash Control Efficiency: 99.00 %  
Temperature: 150.0 deg. F  
Pressure: 50.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

---

Control Device: Combustion Device  
Destruction Efficiency: 99.0 %  
Excess Oxygen: 5.0 %  
Ambient Air Temperature: 50.0 deg. F

## GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Conner 60 MMscfd Dehy 13.7 gpm w/ 99% Emission Control  
 File Name: C:\projects2\wfs\OVM\Conner\Conner CS - NSR - 60 MMscfd DEHY - 10.29.13.ddf  
 Date: December 11, 2013

## DESCRIPTION:

Description: Ext Gas Analysis for Caveney dated 09-23-09.  
 Inlet gas temp = 70F, pressure = 900 psig.  
 Electric Glycol Pump at 13.7 gpm max.  
 Thermal Oxidizer to control flash gas and  
 still vent streams.

Annual Hours of Operation: 8760.0 hours/yr

## EMISSIONS REPORTS:

## CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0085	0.204	0.0372
Ethane	0.0335	0.803	0.1466
Propane	0.0496	1.189	0.2171
Isobutane	0.0119	0.285	0.0520
n-Butane	0.0506	1.215	0.2218
Isopentane	0.0117	0.280	0.0511
n-Pentane	0.0235	0.564	0.1029
n-Hexane	0.0111	0.267	0.0488
Cyclohexane	0.0106	0.255	0.0466
Other Hexanes	0.0066	0.159	0.0290
Heptanes	0.0376	0.903	0.1648
Benzene	0.0159	0.381	0.0696
Toluene	0.0734	1.760	0.3213
Ethylbenzene	0.0168	0.403	0.0736
Xylenes	0.1566	3.757	0.6857
C8+ Heavies	0.0889	2.134	0.3894
<b>Total Emissions</b>	<b>0.6067</b>	<b>14.561</b>	<b>2.6574</b>
Total Hydrocarbon Emissions	0.6067	14.561	2.6574
Total VOC Emissions	0.5647	13.554	2.4736
Total HAP Emissions	0.2737	6.569	1.1989
Total BTEX Emissions	0.2626	6.302	1.1502

## UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.8499	20.399	3.7228
Ethane	3.3462	80.308	14.6563
Propane	4.9558	118.938	21.7063
Isobutane	1.1867	28.482	5.1979
n-Butane	5.0638	121.531	22.1795
Isopentane	1.1668	28.004	5.1107
n-Pentane	2.3483	56.360	10.2857
n-Hexane	1.1132	26.717	4.8758
Cyclohexane	1.0637	25.528	4.6589



Other Hexanes	0.6627	15.906	2.9028
Heptanes	3.7622	90.293	16.4784
Benzene	1.5889	38.135	6.9596
Toluene	7.3351	176.042	32.1277
Ethylbenzene	1.6804	40.330	7.3603
Xylenes	15.6552	375.725	68.5699
C8+ Heavies	8.8914	213.393	38.9443
-----			
Total Emissions	60.6705	1456.093	265.7369
Total Hydrocarbon Emissions	60.6705	1456.093	265.7369
Total VOC Emissions	56.4744	1355.386	247.3579
Total HAP Emissions	27.3729	656.950	119.8933
Total BTEX Emissions	26.2597	630.233	115.0174

## FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1806	4.334	0.7910
Ethane	0.2110	5.064	0.9243
Propane	0.1586	3.806	0.6946
Isobutane	0.0262	0.629	0.1148
n-Butane	0.0874	2.098	0.3829
Isopentane	0.0181	0.434	0.0792
n-Pentane	0.0297	0.712	0.1299
n-Hexane	0.0081	0.195	0.0356
Cyclohexane	0.0019	0.046	0.0083
Other Hexanes	0.0063	0.151	0.0275
Heptanes	0.0139	0.335	0.0611
Benzene	0.0005	0.011	0.0021
Toluene	0.0014	0.035	0.0063
Ethylbenzene	0.0002	0.005	0.0009
Xylenes	0.0013	0.032	0.0058
C8+ Heavies	0.0048	0.114	0.0208
-----			
Total Emissions	0.7500	18.000	3.2851
Total Hydrocarbon Emissions	0.7500	18.000	3.2851
Total VOC Emissions	0.3584	8.602	1.5698
Total HAP Emissions	0.0116	0.278	0.0507
Total BTEX Emissions	0.0034	0.083	0.0151

## FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	18.0597	433.432	79.1013
Ethane	21.1019	506.447	92.4265
Propane	15.8591	380.619	69.4630
Isobutane	2.6216	62.919	11.4828
n-Butane	8.7419	209.807	38.2897
Isopentane	1.8072	43.372	7.9154
n-Pentane	2.9661	71.186	12.9915
n-Hexane	0.8130	19.511	3.5608
Cyclohexane	0.1900	4.560	0.8323
Other Hexanes	0.6274	15.057	2.7479
Heptanes	1.3946	33.471	6.1085
Benzene	0.0468	1.124	0.2051

Toluene	0.1449	3.479	0.6348
Ethylbenzene	0.0199	0.478	0.0872
Xylenes	0.1324	3.178	0.5800
C8+ Heavies	0.4753	11.408	2.0820
-----			
Total Emissions	75.0020	1800.048	328.5087
-----			
Total Hydrocarbon Emissions	75.0020	1800.048	328.5087
Total VOC Emissions	35.8404	860.169	156.9809
Total HAP Emissions	1.1570	27.769	5.0678
Total BTEX Emissions	0.3441	8.258	1.5071

## COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
-----			
Methane	0.1891	4.538	0.8282
Ethane	0.2445	5.868	1.0708
Propane	0.2081	4.996	0.9117
Isobutane	0.0381	0.914	0.1668
n-Butane	0.1381	3.313	0.6047
Isopentane	0.0297	0.714	0.1303
n-Pentane	0.0531	1.275	0.2328
n-Hexane	0.0193	0.462	0.0844
Cyclohexane	0.0125	0.301	0.0549
Other Hexanes	0.0129	0.310	0.0565
Heptanes	0.0516	1.238	0.2259
Benzene	0.0164	0.393	0.0716
Toluene	0.0748	1.795	0.3276
Ethylbenzene	0.0170	0.408	0.0745
Xylenes	0.1579	3.789	0.6915
C8+ Heavies	0.0937	2.248	0.4103
-----			
Total Emissions	1.3567	32.561	5.9425
-----			
Total Hydrocarbon Emissions	1.3567	32.561	5.9425
Total VOC Emissions	0.9231	22.156	4.0434
Total HAP Emissions	0.2853	6.847	1.2496
Total BTEX Emissions	0.2660	6.385	1.1652

## COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
-----			
Methane	82.8241	0.8282	99.00
Ethane	107.0827	1.0708	99.00
Propane	91.1693	0.9117	99.00
Isobutane	16.6807	0.1668	99.00
n-Butane	60.4692	0.6047	99.00
Isopentane	13.0262	0.1303	99.00
n-Pentane	23.2772	0.2328	99.00
n-Hexane	8.4366	0.0844	99.00
Cyclohexane	5.4912	0.0549	99.00
Other Hexanes	5.6507	0.0565	99.00
Heptanes	22.5869	0.2259	99.00
Benzene	7.1646	0.0716	99.00
Toluene	32.7625	0.3276	99.00

Ethylbenzene	7.4475	0.0745	99.00
Xylenes	69.1499	0.6915	99.00
C8+ Heavies	41.0263	0.4103	99.00
-----			
Total Emissions	594.2456	5.9425	99.00
-----			
Total Hydrocarbon Emissions	594.2456	5.9425	99.00
Total VOC Emissions	404.3388	4.0434	99.00
Total HAP Emissions	124.9611	1.2496	99.00
Total BTEX Emissions	116.5245	1.1652	99.00

## EQUIPMENT REPORTS:

-----  
COMBUSTION DEVICE

Ambient Temperature: 50.00 deg. F  
 Excess Oxygen: 5.00 %  
 Combustion Efficiency: 99.00 %  
 Supplemental Fuel Requirement: 2.70e-001 MM BTU/hr

Component	Emitted	Destroyed
Methane	1.00%	99.00%
Ethane	1.00%	99.00%
Propane	1.00%	99.00%
Isobutane	1.00%	99.00%
n-Butane	1.00%	99.00%
Isopentane	1.00%	99.00%
n-Pentane	1.00%	99.00%
n-Hexane	1.00%	99.00%
Cyclohexane	1.00%	99.00%
Other Hexanes	1.00%	99.00%
Heptanes	1.00%	99.00%
Benzene	1.00%	99.00%
Toluene	1.00%	99.00%
Ethylbenzene	1.00%	99.00%
Xylenes	1.00%	99.00%
C8+ Heavies	1.00%	99.00%

-----  
ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25  
 Calculated Dry Gas Dew Point: 0.92 lbs. H2O/MMSCF  
 Temperature: 70.0 deg. F  
 Pressure: 900.0 psig  
 Dry Gas Flow Rate: 60.0000 MMSCF/day  
 Glycol Losses with Dry Gas: 0.5667 lb/hr  
 Wet Gas Water Content: Saturated  
 Calculated Wet Gas Water Content: 25.28 lbs. H2O/MMSCF  
 Calculated Lean Glycol Recirc. Ratio: 13.48 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.62%	96.38%
Carbon Dioxide	99.62%	0.38%
Nitrogen	99.97%	0.03%
Methane	99.97%	0.03%
Ethane	99.93%	0.07%
Propane	99.89%	0.11%
Isobutane	99.86%	0.14%
n-Butane	99.82%	0.18%
Isopentane	99.83%	0.17%
n-Pentane	99.78%	0.22%
n-Hexane	99.67%	0.33%
Cyclohexane	98.39%	1.61%
Other Hexanes	99.74%	0.26%
Heptanes	99.43%	0.57%
Benzene	84.12%	15.88%
Toluene	79.48%	20.52%
Ethylbenzene	75.70%	24.30%
Xylenes	67.77%	32.23%
C8+ Heavies	99.46%	0.54%

## FLASH TANK

Flash Control: Combustion device  
Flash Control Efficiency: 99.00 %  
Flash Temperature: 150.0 deg. F  
Flash Pressure: 50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.92%	0.08%
Carbon Dioxide	31.85%	68.15%
Nitrogen	4.42%	95.58%
Methane	4.49%	95.51%
Ethane	13.69%	86.31%
Propane	23.81%	76.19%
Isobutane	31.16%	68.84%
n-Butane	36.68%	63.32%
Isopentane	39.54%	60.46%
n-Pentane	44.47%	55.53%
n-Hexane	58.00%	42.00%
Cyclohexane	85.33%	14.67%
Other Hexanes	51.86%	48.14%
Heptanes	73.09%	26.91%
Benzene	97.28%	2.72%
Toluene	98.22%	1.78%
Ethylbenzene	98.95%	1.05%
Xylenes	99.27%	0.73%
C8+ Heavies	95.53%	4.47%

## REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	65.53%	34.47%
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	1.26%	98.74%
n-Pentane	1.12%	98.88%
n-Hexane	0.86%	99.14%
Cyclohexane	3.75%	96.25%
Other Hexanes	1.93%	98.07%
Heptanes	0.68%	99.32%
Benzene	5.14%	94.86%
Toluene	8.04%	91.96%
Ethylbenzene	10.52%	89.48%
Xylenes	13.01%	86.99%
C8+ Heavies	12.56%	87.44%

## STREAM REPORTS:

## WET GAS STREAM

Temperature: 70.00 deg. F  
 Pressure: 914.70 psia  
 Flow Rate: 2.50e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.33e-002	6.33e+001
Carbon Dioxide	1.88e-001	5.45e+002
Nitrogen	4.65e-001	8.59e+002
Methane	7.14e+001	7.55e+004
Ethane	1.70e+001	3.38e+004
Propane	6.82e+000	1.98e+004
Isobutane	7.22e-001	2.77e+003
n-Butane	1.97e+000	7.56e+003
Isopentane	3.66e-001	1.74e+003
n-Pentane	5.03e-001	2.39e+003
n-Hexane	1.02e-001	5.79e+002
Cyclohexane	1.40e-002	7.77e+001
Other Hexanes	8.90e-002	5.06e+002
Heptanes	1.36e-001	8.98e+002
Benzene	2.00e-003	1.03e+001
Toluene	6.00e-003	3.64e+001
Ethylbenzene	9.99e-004	7.00e+000
Xylenes	7.00e-003	4.90e+001
C8+ Heavies	1.53e-001	1.72e+003
Total Components	100.00	1.49e+005

## DRY GAS STREAM

-----  
 Temperature: 70.00 deg. F  
 Pressure: 914.70 psia  
 Flow Rate: 2.50e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.93e-003	2.29e+000
Carbon Dioxide	1.87e-001	5.43e+002
Nitrogen	4.65e-001	8.58e+002
Methane	7.14e+001	7.55e+004
Ethane	1.70e+001	3.37e+004
Propane	6.82e+000	1.98e+004
Isobutane	7.21e-001	2.76e+003
n-Butane	1.97e+000	7.55e+003
Isopentane	3.66e-001	1.74e+003
n-Pentane	5.02e-001	2.39e+003
n-Hexane	1.02e-001	5.78e+002
Cyclohexane	1.38e-002	7.64e+001
Other Hexanes	8.88e-002	5.04e+002
Heptanes	1.35e-001	8.93e+002
Benzene	1.68e-003	8.66e+000
Toluene	4.77e-003	2.90e+001
Ethylbenzene	7.57e-004	5.30e+000
Xylenes	4.75e-003	3.32e+001
C8+ Heavies	1.53e-001	1.71e+003
Total Components	100.00	1.49e+005

## LEAN GLYCOL STREAM

-----  
 Temperature: 70.00 deg. F  
 Flow Rate: 1.37e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.84e+001	7.59e+003
Water	1.50e+000	1.16e+002
Carbon Dioxide	2.66e-012	2.05e-010
Nitrogen	3.41e-013	2.63e-011
Methane	8.24e-018	6.35e-016
Ethane	1.50e-007	1.15e-005
Propane	1.10e-008	8.47e-007
Isobutane	1.48e-009	1.14e-007
n-Butane	4.44e-009	3.42e-007
Isopentane	1.94e-004	1.49e-002
n-Pentane	3.46e-004	2.67e-002
n-Hexane	1.26e-004	9.67e-003
Cyclohexane	5.38e-004	4.14e-002
Other Hexanes	1.69e-004	1.30e-002
Heptanes	3.36e-004	2.59e-002
Benzene	1.12e-003	8.61e-002
Toluene	8.33e-003	6.42e-001
Ethylbenzene	2.56e-003	1.97e-001
Xylenes	3.04e-002	2.34e+000
C8+ Heavies	1.66e-002	1.28e+000
Total Components	100.00	7.71e+003

## RICH GLYCOL STREAM

-----  
 Temperature: 70.00 deg. F  
 Pressure: 914.70 psia  
 Flow Rate: 1.41e+001 gpm  
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
-----	-----	-----
TEG	9.60e+001	7.59e+003
Water	2.23e+000	1.77e+002
Carbon Dioxide	2.59e-002	2.05e+000
Nitrogen	3.34e-003	2.64e-001
Methane	2.39e-001	1.89e+001
Ethane	3.09e-001	2.44e+001
Propane	2.63e-001	2.08e+001
Isobutane	4.82e-002	3.81e+000
n-Butane	1.75e-001	1.38e+001
Isopentane	3.78e-002	2.99e+000
n-Pentane	6.76e-002	5.34e+000
n-Hexane	2.45e-002	1.94e+000
Cyclohexane	1.64e-002	1.30e+000
Other Hexanes	1.65e-002	1.30e+000
Heptanes	6.56e-002	5.18e+000
Benzene	2.18e-002	1.72e+000
Toluene	1.03e-001	8.12e+000
Ethylbenzene	2.40e-002	1.90e+000
Xylenes	2.29e-001	1.81e+001
C8+ Heavies	1.35e-001	1.06e+001
-----	-----	-----
Total Components	100.00	7.91e+003

## FLASH TANK OFF GAS STREAM

-----  
 Temperature: 150.00 deg. F  
 Pressure: 64.70 psia  
 Flow Rate: 9.63e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	3.20e-001	1.46e-001
Carbon Dioxide	1.25e+000	1.40e+000
Nitrogen	3.55e-001	2.52e-001
Methane	4.44e+001	1.81e+001
Ethane	2.77e+001	2.11e+001
Propane	1.42e+001	1.59e+001
Isobutane	1.78e+000	2.62e+000
n-Butane	5.93e+000	8.74e+000
Isopentane	9.87e-001	1.81e+000
n-Pentane	1.62e+000	2.97e+000
n-Hexane	3.72e-001	8.13e-001
Cyclohexane	8.90e-002	1.90e-001
Other Hexanes	2.87e-001	6.27e-001
Heptanes	5.49e-001	1.39e+000
Benzene	2.36e-002	4.68e-002
Toluene	6.20e-002	1.45e-001
Ethylbenzene	7.39e-003	1.99e-002
Xylenes	4.92e-002	1.32e-001

C8+ Heavies	1.10e-001	4.75e-001
-----		
Total Components	100.00	7.68e+001

## FLASH TANK GLYCOL STREAM

Temperature: 150.00 deg. F  
Flow Rate: 1.39e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
-----		
TEG	9.69e+001	7.59e+003
Water	2.25e+000	1.76e+002
Carbon Dioxide	8.34e-003	6.53e-001
Nitrogen	1.49e-004	1.17e-002
Methane	1.09e-002	8.50e-001
Ethane	4.27e-002	3.35e+000
Propane	6.33e-002	4.96e+000
Isobutane	1.52e-002	1.19e+000
n-Butane	6.47e-002	5.06e+000
Isopentane	1.51e-002	1.18e+000
n-Pentane	3.03e-002	2.37e+000
n-Hexane	1.43e-002	1.12e+000
Cyclohexane	1.41e-002	1.11e+000
Other Hexanes	8.63e-003	6.76e-001
Heptanes	4.84e-002	3.79e+000
Benzene	2.14e-002	1.67e+000
Toluene	1.02e-001	7.98e+000
Ethylbenzene	2.40e-002	1.88e+000
Xylenes	2.30e-001	1.80e+001
C8+ Heavies	1.30e-001	1.02e+001
-----		
Total Components	100.00	7.83e+003

## FLASH GAS EMISSIONS

Flow Rate: 4.71e+003 scfh  
Control Method: Combustion Device  
Control Efficiency: 99.00

Component	Conc. (vol%)	Loading (lb/hr)
-----		
Water	5.96e+001	1.33e+002
Carbon Dioxide	4.01e+001	2.19e+002
Nitrogen	7.27e-002	2.52e-001
Methane	9.08e-002	1.81e-001
Ethane	5.66e-002	2.11e-001
Propane	2.90e-002	1.59e-001
Isobutane	3.64e-003	2.62e-002
n-Butane	1.21e-002	8.74e-002
Isopentane	2.02e-003	1.81e-002
n-Pentane	3.31e-003	2.97e-002
n-Hexane	7.60e-004	8.13e-003
Cyclohexane	1.82e-004	1.90e-003
Other Hexanes	5.87e-004	6.27e-003
Heptanes	1.12e-003	1.39e-002
Benzene	4.83e-005	4.68e-004
Toluene	1.27e-004	1.45e-003



Ethylbenzene	1.51e-005	1.99e-004
Xylenes	1.01e-004	1.32e-003
C8+ Heavies	2.25e-004	4.75e-003

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Total Components	100.00	3.53e+002
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 REGENERATOR OVERHEADS STREAM
 

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Temperature: 212.00 deg. F  
 Pressure: 14.70 psia  
 Flow Rate: 1.60e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.02e+001	6.08e+001
Carbon Dioxide	3.52e-001	6.53e-001
Nitrogen	9.90e-003	1.17e-002
Methane	1.26e+000	8.50e-001
Ethane	2.64e+000	3.35e+000
Propane	2.67e+000	4.96e+000
Isobutane	4.85e-001	1.19e+000
n-Butane	2.07e+000	5.06e+000
Isopentane	3.84e-001	1.17e+000
n-Pentane	7.73e-001	2.35e+000
n-Hexane	3.07e-001	1.11e+000
Cyclohexane	3.00e-001	1.06e+000
Other Hexanes	1.83e-001	6.63e-001
Heptanes	8.91e-001	3.76e+000
Benzene	4.83e-001	1.59e+000
Toluene	1.89e+000	7.34e+000
Ethylbenzene	3.76e-001	1.68e+000
Xylenes	3.50e+000	1.57e+001
C8+ Heavies	1.24e+000	8.89e+000
Total Components	100.00	1.22e+002

---

 COMBUSTION DEVICE OFF GAS STREAM
 

---

Temperature: 1000.00 deg. F  
 Pressure: 14.70 psia  
 Flow Rate: 3.11e+000 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	6.47e+000	8.50e-003
Ethane	1.36e+001	3.35e-002
Propane	1.37e+001	4.96e-002
Isobutane	2.49e+000	1.19e-002
n-Butane	1.06e+001	5.06e-002
Isopentane	1.97e+000	1.17e-002
n-Pentane	3.97e+000	2.35e-002
n-Hexane	1.58e+000	1.11e-002
Cyclohexane	1.54e+000	1.06e-002
Other Hexanes	9.39e-001	6.63e-003
Heptanes	4.58e+000	3.76e-002
Benzene	2.48e+000	1.59e-002
Toluene	9.72e+000	7.34e-002
Ethylbenzene	1.93e+000	1.68e-002
Xylenes	1.80e+001	1.57e-001

C8+ Heavies	6.37e+000	8.89e-002
-----	-----	-----
Total Components	100.00	6.07e-001

Complete this form for any oil and natural gas production or natural gas transmission and storage facility that uses an affected unit under HH/HHH, whether subject or not.

<b>Section A: Facility Description</b>			
Affected facility actual annual average natural gas throughput (scf/day):			<b>120 MM</b>
Affected facility actual annual average hydrocarbon liquid throughput: (bbl/day):			<b>na</b>
The affected facility processes, upgrades, or stores hydrocarbon liquids prior to custody transfer.			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
The affected facility processes, upgrades, or stores natural gas prior to the point at which natural gas (NG) enters the NG transmission and storage source category or is delivered to the end user.			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
The affected facility is: <input type="checkbox"/> prior to a NG processing plant <input type="checkbox"/> a NG processing plant <input type="checkbox"/> prior to the point of custody transfer and there is no NG processing plant			
The affected facility transports or stores natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company).			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
The affected facility exclusively processes, stores, or transfers black oil			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
.Initial producing gas-to-oil ratio (GOR): _____scf/bbl      API gravity: _____degrees			
<b>Section B: Dehydration Unit (if applicable)<sup>1</sup></b>			
Description: <b>60 MMscfd - TEG Dehydrator (RSV-1 and RSV-2)</b>			
Date of Installation:	<b>Feb-2015 (RSV-1)</b>	Annual Operating Hours:	<b>8,760</b>
		Burner rating (MMBtu/hr) - HHV:	<b>1.66</b>
Exhaust Stack Height (ft):	<b>~ 10</b>	Stack Diameter (ft):	<b>~ 0.5</b>
		Stack Temp. (°F):	<b>---</b>
Glycol Type: <input checked="" type="checkbox"/> TEG <input type="checkbox"/> EG <input type="checkbox"/> Other: <b>na</b>			
Glycol Pump Type: <input checked="" type="checkbox"/> Electric <input type="checkbox"/> Gas      If gas, what is the volume ratio?: <b>na</b>			
Condenser installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      Exit Temp: <b>na</b> Condenser Pressure: <b>na</b>			
Incinerator/flare installed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No      Destruction Eff.: <b>99% VOC/HAPs</b>			
Other controls installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No      Describe: <b>na</b>			
Wet Gas <sup>2</sup> : Gas Temp: <b>70 °F</b> Gas Pressure: <b>900 psig</b>			
(Upstream of Contact Tower) Saturated Gas?: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No      If no, water content?: <b>na</b>			
Dry Gas: Gas Flowrate: Actual: <b>60 MMscfd</b> Design: <b>60 MMscfd</b>			
(Downstream of Contact Tower) Water Content: <b>7.0 lb/MMscf</b>			
Lean Glycol: Circulation rate: Actual <sup>3</sup> : <b>13.7</b> Maximum <sup>4</sup> : <b>13.7</b>			
Pump make/model: <b>na</b>			
Temp: <b>150 °F</b> Pressure: <b>50 psig</b> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Glycol Flash Tank (if applicable): If no, describe vapor control: <b>Vapors Typically Sent to Thermal Oxidizer</b> <b>Vapors may also be used as fuel gas for various equipment</b>			
Stripping Gas (if applicable): Source of gas: <b>na</b> Rate: <b>na</b>			

**Please attach the following required dehydration unit information:**

1. System map indicating the chain of custody information. See Page 43 of this document for an example of a gas flow schematic. It is not intended that the applicant provide this level of detail for all sources. The level of detail that is necessary is to establish where the custody transfer points are located. This can be accomplished by submitting a process flow diagram indicating custody transfer points and the natural gas flow. However, the DAQ reserves the right to request more detailed information in order to make the necessary decisions.
2. Extended gas analysis from the Wet Gas Stream, including mole percent of C<sub>1</sub>-C<sub>8</sub>, benzene, ethylbenzene, toluene, xylene and n-hexane, using Gas Processors Association (GPA) 2286 (or similar). A sample should be taken from the inlet gas line, downstream from any inlet separator, and using a manifold to remove entrained liquids from the sample and a probe to collect the sample from the center of the gas line. GPA standard 2166 reference method or a modified version of EPA Method TO-14, (or similar) should be used.
3. GRI-GLYCalc Ver. 3.0 aggregate report based on maximum Lean Glycol circulation rate and maximum throughput.
4. Detailed calculations of gas or hydrocarbon flow rate.

**Section C: Facility NESHAPS Subpart HH/HHH status**

Affected facility status: (choose only one)	<input checked="" type="checkbox"/> Subject to Subpart HH
	<input type="checkbox"/> Subject to Subpart HHH
	<input type="checkbox"/> Not Subject because:
	<input type="checkbox"/> < 10/25 TPY
	<input type="checkbox"/> Affected facility exclusively handles black oil
	<input type="checkbox"/> Facility-wide actual annual average NG throughput is < 650 thousand scf/day and facility-wide actual annual average hydrocarbon liquid is < 250 bpd
	<input type="checkbox"/> No affected source is present

## NATURAL GAS FIRED BOILER/LINE HEATER DATA SHEET

(Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.)

Source ID # <sup>1</sup>	Status <sup>2</sup>	Design Heat Input (MMBtu/hr) <sup>3</sup>	Hours of Operation (hrs/yr) <sup>4</sup>	Fuel Heating Value (Btu/scf) <sup>5</sup>	
<b>HTR-01</b>	<b>Existing</b>	<b>1.55 (HHV)</b>	<b>8,760</b>	<b>920 (LHV)</b>	
<b>HTR-02</b>	<b>Existing</b>	<b>2.55 (HHV)</b>	<b>8,760</b>	<b>920 (LHV)</b>	
<b>HTR-03</b>	<b>New</b>	<b>1.66 (HHV)</b>	<b>8,760</b>	<b>920 (LHV)</b>	
<b>HTR-04</b>	<b>New</b>	<b>9.70 (HHV)</b>	<b>8,760</b>	<b>920 (LHV)</b>	

### Notes to NATURAL GAS FIRED BOILER/LINE HEATER DATA SHEET

1. Enter the appropriate Source Identification Numbers (Source ID #) for each boiler or line heater located at the compressor station. Boilers should be designated BLR-1, BLR-2, BLR-3, etc. Heaters or Line Heaters should be designated HTR-1, HTR-2, HTR-3, etc.
2. Enter the Status for each boiler or line heater using the following:  
 EXIST Existing Equipment  
 NEW Installation of New Equipment  
 REM Equipment Removed
3. Enter boiler or line heater design heat input in MMBtu/hr.
4. Enter the annual hours of operation in hours/year for each boiler or line heater.
5. Enter the fuel heating value in Btu/standard cubic foot.

## STORAGE TANK DATA SHEET

Source ID # <sup>1</sup>	Status <sup>2</sup>	Content <sup>3</sup>	Volume <sup>4</sup> (gal)	Dia <sup>5</sup> (ft)	Throughput <sup>6</sup> (gal/yr)	Orientation <sup>7</sup>	Ave Liq Ht <sup>8</sup> (Ft)
<b>T01</b>	<b>EXIST</b>	<b>Produced Water**</b>	<b>2,000</b>	<b>5.3</b>	<b>104,000</b>	<b>HORZ</b>	<b>3</b>
<b>T02</b>	<b>NEW</b>	<b>Produced Water**</b>	<b>8,820</b>	<b>10</b>	<b>458,640</b>	<b>VERT</b>	<b>7</b>
<b>T03</b>	<b>EXIST</b>	<b>Slop Oil</b>	<b>2,000</b>	<b>na</b>	<b>24,000</b>	<b>HORZ</b>	<b>3</b>
<b>T04</b>	<b>EXIST</b>	<b>Make-Up Oil</b>	<b>3,000</b>	<b>na</b>	<b>36,000</b>	<b>HORZ</b>	<b>4</b>
<b>T05</b>	<b>EXIST</b>	<b>Lube Oil</b>	<b>55</b>	<b>na</b>	<b>660</b>	<b>na</b>	<b>na</b>
<b>T06</b>	<b>EXIST</b>	<b>Engine Oil</b>	<b>520</b>	<b>na</b>	<b>6,240</b>	<b>na</b>	<b>na</b>
<b>T07</b>	<b>EXIST</b>	<b>Engine Oil</b>	<b>520</b>	<b>na</b>	<b>6,240</b>	<b>na</b>	<b>na</b>
<b>T08</b>	<b>EXIST</b>	<b>Engine Oil</b>	<b>520</b>	<b>na</b>	<b>6,240</b>	<b>na</b>	<b>na</b>
<b>T09</b>	<b>EXIST</b>	<b>Engine Oil</b>	<b>520</b>	<b>na</b>	<b>6,240</b>	<b>na</b>	<b>na</b>
<b>T10</b>	<b>EXIST</b>	<b>Triethylene Glycol</b>	<b>1,000</b>	<b>na</b>	<b>12,000</b>	<b>na</b>	<b>na</b>
<b>T11</b>	<b>EXIST</b>	<b>Monoethylene Glycol</b>	<b>1,000</b>	<b>na</b>	<b>12,000</b>	<b>na</b>	<b>na</b>
<b>T12</b>	<b>EXIST</b>	<b>Monoethylene Glycol</b>	<b>2,000</b>	<b>na</b>	<b>24,000</b>	<b>na</b>	<b>na</b>

**\*\* Storage tanks are heated to approximately 60 degrees Fahrenheit to prevent freezing.**

### Notes to STORAGE TANK DATA SHEET

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:  
 EXIST Existing Equipment  
 NEW Installation of New Equipment  
 REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, etc.
4. Enter storage tank volume in gallons.
5. Enter storage tank diameter in feet.
6. Enter storage tank throughput in gallons per year.
7. Enter storage tank orientation using the following:  
 VERT Vertical Tank  
 HORZ Horizontal Tank
8. Enter storage tank average liquid height in feet.

## Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

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

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

### I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name CONNER STATION	2. Tank Name 48 BBL PRODUCED WATER TANK
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> ) T01	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i> ) 13E
5. Date of Commencement of Construction (for existing tanks) 2014	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

### II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <p style="text-align: center;">48 BBL</p>	
9A. Tank Internal Diameter (ft) <p style="text-align: center;">5.3</p>	9B. Tank Internal Height (or Length) (ft) <p style="text-align: center;">12</p>
10A. Maximum Liquid Height (ft) <p style="text-align: center;">5</p>	10B. Average Liquid Height (ft) <p style="text-align: center;">3</p>
11A. Maximum Vapor Space Height (ft) <p style="text-align: center;">5</p>	11B. Average Vapor Space Height (ft) <p style="text-align: center;">3</p>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <p style="text-align: center;">48 BBL</p>	

13A. Maximum annual throughput (gal/yr) 104,000 GAL/YR	13B. Maximum daily throughput (gal/day) 285
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 52	
15. Maximum tank fill rate (gal/min) 200 GAL/MIN	
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year CONTINUOUS
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof      vertical      X horizontal      flat roof      ___ cone roof      ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof      ___ pontoon roof      ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof      ___ vertical column support      ___ self-supporting <input type="checkbox"/> Variable Vapor Space      ___ lifter roof      ___ diaphragm <input type="checkbox"/> Pressurized      ___ spherical      ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

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

19. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) WELDED		
20A. Shell Color GREEN	20B. Roof Color GREEN	20C. Year Last Painted na
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F) 60		
22C. If YES, please describe how heat is provided to tank. Electric heater		
23. Operating Pressure Range (psig): ATM to 0.7 PSIG		
24. Complete the following section for <b>Vertical Fixed Roof Tanks</b> <input checked="" type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for <b>Floating Roof Tanks</b> <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed: NA		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		



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

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

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

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

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

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



## Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

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

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

### I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name CONNER STATION	2. Tank Name 210 BBL PRODUCED WATER TANK
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i> ) T02	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i> ) 21E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

### II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: center;">210 bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">10</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">15</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">14</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">7</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">7</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">7</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: center;">210 BBL</div>	

13A. Maximum annual throughput (gal/yr) 458,640 GAL/YR	13B. Maximum daily throughput (gal/day) 1,257
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 52	
15. Maximum tank fill rate (gal/min) 200 GAL/MIN	
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year CONTINUOUS
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof    X vertical    ___ horizontal    flat roof    X cone roof    ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof    ___ pontoon roof    ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof    ___ vertical column support    ___ self-supporting <input type="checkbox"/> Variable Vapor Space    ___ lifter roof    ___ diaphragm <input type="checkbox"/> Pressurized    ___ spherical    ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

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

19. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input checked="" type="checkbox"/> Other (describe) WELDED		
20A. Shell Color GREEN	20B. Roof Color GREEN	20C. Year Last Painted na
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F) NA		
22C. If YES, please describe how heat is provided to tank. NA		
23. Operating Pressure Range (psig): ATM to 0.7 PSIG		
24. Complete the following section for <b>Vertical Fixed Roof Tanks</b>		<input type="checkbox"/> Does Not Apply
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for <b>Floating Roof Tanks</b>		<input checked="" type="checkbox"/> Does Not Apply
25A. Year Internal Floaters Installed: NA		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

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

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

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

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

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

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





Conner Produced Water Tank ProMax Summary

Produced Liquids		
Temperature	°F	111.92
Pressure	psig	0.60
Std Liquid Volumetric Flow	bbbl/d	2.81

Emissions to Atmosphere	
Component	tons/year
Nitrogen	0.0001
Carbon Dioxide	0.0009
Methane	0.0105
Ethane	0.0230
Propane	0.0262
Isobutane	0.0017
n-Butane	0.0080
Propane, 2,2-Dimethyl-	0.0000
Isopentane	0.0008
n-Pentane	0.0008
2-2-Dimethylbutane	0.0000
2-3-Dimethylbutane	0.0000
2-Methylpentane	0.0000
3-Methylpentane	0.0001
n-Hexane	0.0000
Methylcyclopentane	0.0000
Benzene	0.0000
Cyclohexane	0.0000
2-Methylhexane	0.0000
3-Methylhexane	0.0000
n-Heptane	0.0000
Methylcyclohexane	0.0000
Toluene	0.0000
n-Octane	0.0000
Ethylbenzene	0.0000
o-Xylene	0.0000
n-Nonane	0.0000
n-Decane	0.0000
Undecane	0.0000
Water	0.003898961

**Attachment L**  
**EMISSIONS UNIT DATA SHEET**  
**BULK LIQUID TRANSFER OPERATIONS**

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

Identification Number (as assigned on <i>Equipment List Form</i> ): <b>TLO-1 and TLO-2</b>				
1. Loading Area Name: <b>CONNER STATION</b>				
2. Type of <b>cargo vessels</b> accommodated at this rack or transfer point (check as many as apply): <input type="checkbox"/> Drums <input type="checkbox"/> Marine Vessels <input type="checkbox"/> Rail Tank Cars <input checked="" type="checkbox"/> Tank Trucks				
3. Loading Rack or Transfer Point Data:				
Number of pumps	2			
Number of liquids loaded	2			
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1			
4. Does ballasting of <b>marine vessels</b> occur at this loading area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <b><u>Does not apply</u></b>				
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: <b>NA</b>				
6. Are cargo vessels <b>pressure tested</b> for leaks at this or any other location? <b>NA</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <b><u>Does not apply</u></b> If YES, describe: <b>NA</b>				
7. <b>Projected Maximum Operating Schedule</b> (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24
days/week	7	7	7	7
weeks/quarter	13	13	13	13

8. Bulk Liquid Data (add pages as necessary):						
Pump ID No.	1	2				
Liquid Name	Prod. H2O	Stab. Cond.				
Max. daily throughput (1000 gal/day)	1.54	0.68				
Max. annual throughput (1000 gal/yr)	563	250				
Loading Method <sup>1</sup>	SP	SP				
Max. Fill Rate (gal/min)	200	200				
Average Fill Time (min/loading)	60	60				
Max. Bulk Liquid Temperature (°F)	60	60				
True Vapor Pressure <sup>2</sup>	1.5	10.0				
Cargo Vessel Condition <sup>3</sup>	U	U				
Control Equipment or Method <sup>4</sup>	None	None				
Minimum control efficiency (%)	N/A	N/A				
Maximum Emission Rate (VOC)	Loading (lb/hr)	---	---			
	Annual (lb/yr)	900	4,940			
Estimation Method <sup>5</sup>	EPA	EPA				
<sup>1</sup> BF = Bottom Fill    SP = Splash Fill    SUB = Submerged Fill						
<sup>2</sup> At maximum bulk liquid temperature						
<sup>3</sup> B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)						
<sup>4</sup> List as many as apply (complete and submit <i>Air Pollution Control Device Sheets</i> ): CA = Carbon Adsorption, LOA = Lean Oil Adsorption, CO = Condensation, SC = Scrubber (Absorption), CRA = Compressor-Refrigeration-Absorption, TO = Thermal Oxidation or Incineration, CRC = Compression-Refrigeration-Condensation, VB = Dedicated Vapor Balance (closed system), O = other (describe)						
<sup>5</sup> EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)						

**NOTE: STABILIZED CONDENSATE WILL BE LOADED INTO TANKER TRUCKS ONLY IN THE EVENT OF A PIPELINE OUTAGE. THE NORMAL OPERATING MODE IS TO SEND STABILIZED CONDENSATE OFFSITE VIA PIPELINE.**

**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

REPORTING

TESTING

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

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

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

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

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

**NA**

**ATTACHMENT M**  
**Air Pollution Control Device Sheet(s)**

---

“29. Fill out the **Air Pollution Control Device Sheet(s)** as Attachment M.”

---

- **1,380 bhp CAT G3516B Compressor Engine**
    - Oxidation Catalyst (OxCat) – Vendor (EMIT) Data
  - **203 bhp CAT G3306B TA Compressor Engine**
    - Non-Selective Catalytic Reduction (NSCR) – Vendor (Miratech) Data
  - **6.4 MMBtu/hr Thermal Oxidizer**
-

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

Control Device ID No. (must match Emission Units Table): 01-OxCat and 02-OxCat

**Equipment Information**

1. Manufacturer: EMIT Technologies Model No. RE-3050-H (or equiv.)	2. Control Device Name: Catalytic Converter Type: OxCat
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected:  CO (≥94.6%), NMNEHC (≥90.8%) and HCHO (≥75.7%)	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: _____ SCFM	10. Capacity: _____
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.   	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal.   	

**Gas Stream Characteristics**

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



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

28. Describe the collection material disposal system:

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

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

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

MONITORING:

RECORDKEEPING:

REPORTING:

TESTING:

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

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

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

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

CO (≥94.6%), NMNEHC (≥90.8%) and HCHO (≥75.7%)

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

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





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 Houston, TX 77024  
 Office: 307.673.0883 | Direct: 307.675.5073  
 cparisi@emittechnologies.com

**Prepared For:**  
 Jose Parilli  
 WILLIAMS FIELD SERVICES

**QUOTE:** QUO-10943-S3Z0  
**Expires:** December 14, 2013

**INFORMATION PROVIDED BY CATERPILLAR**

Engine: G3516B  
 Horsepower: 1343  
 RPM: 1400  
 Compression Ratio: 8.0  
 Exhaust Flow Rate: 8996 CFM  
 Exhaust Temperature: 1026 °F  
 Reference: DM8800-07-001  
 Fuel: Natural Gas  
 Annual Operating Hours: 8760

**Uncontrolled Emissions**

	<u>g/bhp-hr</u>	<u>Lb/Hr</u>	<u>Tons/Year</u>
NOx:	0.50	1.48	6.48
CO:	3.08	9.12	39.94
THC:	3.97	11.75	51.48
NMHC	2.00	5.92	25.94
NMNEHC:	1.06	3.14	13.75
HCHO:	0.36	1.07	4.67
O2:	9.10 %		

**POST CATALYST EMISSIONS**

	<u>g/bhp-hr</u>	<u>Lb/Hr</u>	<u>Tons/Year</u>
NOx:	Unaffected by Oxidation Catalyst		
CO:	<0.17	<0.50	<2.20
VOC:	<0.10	<0.30	<1.30
HCHO:	<0.09	<0.27	<1.17

**CONTROL EQUIPMENT**

**Catalyst Element**

Model: RE-3050-H  
 Catalyst Type: Oxidation, Premium Precious Group Metals  
 Substrate Type: BRAZED  
 Manufacturer: EMIT Technologies, Inc  
 Element Quantity: 2  
 Element Size: Round 30.5" x 3.25"  
 Estimated Lead Time: In Stock

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

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

**Equipment Information**

1. Manufacturer: Miratech Model No. VXC-1610-05-XC1 (or equiv.)	2. Control Device Name: Catalytic Converter Type: NSCR
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected:  NOx (≥97%) and CO (≥87%)	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: _____ SCFM	10. Capacity: _____
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.   	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal.   	

**Gas Stream Characteristics**

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



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

28. Describe the collection material disposal system:

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

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

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

MONITORING:

RECORDKEEPING:

REPORTING:

TESTING:

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

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

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

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

NO<sub>x</sub> (≥97%) and CO (≥87%)

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

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

**MIRATECH Emissions Control Equipment Specification Summary**

Proposal Number: JC-13-2686 Rev(2)

**Engine Data**

Number of Engines: 1  
 Application: Gas Compression  
 Engine Manufacturer: Caterpillar  
 Model Number: G 3306 TA HCR  
 Power Output: 203 bhp  
 Lubrication Oil: 0.6 wt% sulfated ash or less  
 Type of Fuel: Natural Gas  
 Exhaust Flow Rate: 970 acfm (cfm)  
 Exhaust Temperature: 1,064°F

**System Details**

Housing Model Number: VXC-1610-05-HSG  
 Element Model Number: VX-RE-10XC  
 Number of Catalyst Layers: 1  
 Number of Spare Catalyst Layers: 1  
 System Pressure Loss: 4.0 inches of WC (Fresh)  
 Sound Attenuation: 28-32 dBA insertion loss  
 Exhaust Temperature Limits: 750 – 1250°F (catalyst inlet); 1350°F (catalyst outlet)

**NSCR Housing & Catalyst Details**

Model Number: VXC-1610-05-XC1  
 Material: Carbon Steel  
 Approximate Diameter: 16 inches  
 Inlet Pipe Size & Connection: 5 inch FF Flange, 150# ANSI standard bolt pattern  
 Outlet Pipe Size & Connection: 5 inch FF Flange, 150# ANSI standard bolt pattern  
 Overall Length: 65 inches  
 Weight Without Catalyst: 191 lbs  
 Weight Including Catalyst: 205 lbs  
 Instrumentation Ports: 1 inlet/1 outlet (1/2" NPT)

**Emission Requirements**

Exhaust Gases	Engine Outputs (g/ bhp-hr)	Reduction (%)	Warranted Converter Outputs (g/ bhp-hr)	Requested Emissions Targets
NOx	15.26	97%	0.50	0.50 g/bhp-hr
CO	15.26	87%	2.00	2.00 g/bhp-hr
NMNEHC	0.12	0%	0.70	0.70 g/bhp-hr
Oxygen	0.5%			

MIRATECH warrants the performance of the converter, as stated above, per the MIRATECH General Terms and Conditions of Sale.

**Attachment M**  
**Air Pollution Control Device Sheet**  
 (FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): COMB-1

**Equipment Information**

1. Manufacturer: Frederick Logan Company, Inc.  Model No. na	2. Method: <input type="checkbox"/> Elevated flare <input type="checkbox"/> Ground flare <input type="checkbox"/> Other Describe Thermal Oxidizer
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Method of system used: <input type="checkbox"/> Steam-assisted <input type="checkbox"/> Air-assisted <input type="checkbox"/> Pressure-assisted <input checked="" type="checkbox"/> Non-assisted	
5. Maximum capacity of flare:  <div style="text-align: right;">scf/min</div> <div style="text-align: right;">scf/hr</div>	6. Dimensions of stack:  <div style="text-align: right;">Diameter    3.0                      ft.</div> <div style="text-align: right;">Height        20.0                      ft.</div>
7. Estimated combustion efficiency: (Waste gas destruction efficiency)  Estimated:                      99                      % Minimum guaranteed:        99                      %	8. Fuel used in burners: <input checked="" type="checkbox"/> Natural Gas <input type="checkbox"/> Fuel Oil, Number <input type="checkbox"/> Other, Specify:
9. Number of burners:  Rating:                                      BTU/hr	11. Describe method of controlling flame:
10. Will preheat be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Flare height:                                      ft	14. Natural gas flow rate to flare pilot flame per pilot light:  <div style="text-align: right;">500                                      scf/hr</div>
13. Flare tip inside diameter:                      ft	
15. Number of pilot lights:  Total    BTU/hr	16. Will automatic re-ignition be used? <input type="checkbox"/> Yes <input type="checkbox"/> No
17. If automatic re-ignition will be used, describe the method:	
18. Is pilot flame equipped with a monitor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, Describe:	
19. Hours of unit operation per year: 8,760	

### Steam Injection

20. Will steam injection be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Steam pressure <span style="float: right;">PSIG</span> Minimum Expected: Design Maximum:
22. Total Steam flow rate: <span style="float: right;">LB/hr</span>	23. Temperature: <span style="float: right;">°F</span>
24. Velocity <span style="float: right;">ft/sec</span>	25. Number of jet streams
26. Diameter of steam jets: <span style="float: right;">in</span>	27. Design basis for steam injected: <span style="float: right;">LB steam/LB hydrocarbon</span>
28. How will steam flow be controlled if steam injection is used?	

### Characteristics of the Waste Gas Stream to be Burned

29. Name	Quantity Grains of H <sub>2</sub> S/100 ft <sup>3</sup>	Quantity (LB/hr, ft <sup>3</sup> /hr, etc)	Source of Material
Waste Gas + Pilot Gas	neg.	5,626 scfh	Dehydrators
30. Estimate total combustible to flare:		LB/hr or ACF/hr	
(Maximum mass flow rate of waste gas) <span style="float: right;">108.5</span>		scfm	
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:			
LB/hr or ACF/hr			
32. Give composition of carrier gases:			
33. Temperature of emission stream: 60 °F		34. Identify and describe all auxiliary fuels to be burned.	
Heating value of emission stream: 2,200 BTU/ft <sup>3</sup>			
Mean molecular weight of emission stream: MW = 47.6 lb/lb-mole			
35. Temperature of flare gas: <span style="float: right;">°F</span>		36. Flare gas flow rate: <span style="float: right;">scf/min</span>	
37. Flare gas heat content: 901 BTU/ft <sup>3</sup>		38. Flare gas exit velocity: <span style="float: right;">scf/min</span>	
39. Maximum rate during emergency for one major piece of equipment or process unit:			scf/min
40. Maximum rate during emergency for one major piece of equipment or process unit:			BTU/min
41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):			
42. Describe the collection material disposal system:			
43. Have you included <b>Flare Control Device</b> in the Emissions Points Data Summary Sheet? yes			

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

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

<p><b>MONITORING:</b> Continuously monitor presence of a pilot flame.</p>	<p><b>RECORDKEEPING:</b> Keep records of time periods when pilot flame is absent and waste gases are sent to the flare.</p>
---	---

<p><b>REPORTING:</b> Not applicable</p>	<p><b>TESTING:</b> Not applicable</p>
---	---

<p><b>MONITORING:</b></p>	<p>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.</p>
<p><b>RECORDKEEPING:</b></p>	<p>Please describe the proposed recordkeeping that will accompany the monitoring.</p>
<p><b>REPORTING:</b></p>	<p>Please describe any proposed emissions testing for this process equipment on air pollution control device.</p>
<p><b>TESTING:</b></p>	<p>Please describe any proposed emissions testing for this process equipment on air pollution control device.</p>

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.  
99% destruction efficiency for VOC and HAPs

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



# ATTACHMENT N

## Supporting Emissions Calculations

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“30. Provide all **Supporting Emissions Calculations** as Attachment N.”

---

- **Emission Summary Spreadsheets**
    - Controlled Emissions – Criteria Pollutants
    - Controlled Emissions – Hazardous Air Pollutants (HAP)
    - Greenhouse Gas Emissions
    - PRE-Controlled Emissions – Criteria Pollutants
    - PRE-Controlled Emissions – Hazardous Air Pollutants (HAP)
  
  - **Unit-Specific Emission Spreadsheets**
    - Compressor Engine 01 and 02 – 1,380 bhp CAT G3516B (4SLB)
    - Compressor Engine 03 – 203 bhp CAT G3306B (4SRB)
    - Rod Packing/Crankcase Leaks (RPC)
    - Startup, Shutdown and Maintenance (and Blowdown) (SSM)
    - Reboilers 01 and 02 - 1.66 MMBtu/hr
    - Dehydrators 01 and 02 (Still Vents and Flash Tanks) - 60 MMscfd
    - Dehydrators 01 and 02 (Summary) - 60 MMscfd
    - Thermal Oxidizer 01 – 6.4 MMBtu/hr
    - Heater Treater 01 - 1.55 MMBtu/hr
    - Condensate Stabilizer Heater 01 - 2.55 MMBtu/hr
    - Station Recycle Line Heater 01 - 1.66 MMBtu/hr
    - Condensate Stabilizer Heater 02 – 9.70 MMBtu/hr
    - Produced Water Storage Tanks - 48 bbl and 210 bbl Capacity
    - Produced Water - Truck Load-Out 01
    - Condensate - Truck Load-Out 02
    - Piping and Equipment Fugitives - Gas & Light Oil (Condensate)
  
  - **AP-42 and GHG Emission Factors**
-

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment N - Supporting Emissions Calculations**  
**Controlled Emissions - Criteria Pollutants**

Unit ID	Point ID	Control ID	Description	Design Capacity	NOx		CO		VOC		SOx		PM10/2.5	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	1E	01-OxCat	Caterpillar G3516B Engine	1,380 bhp	1.52	6.66	0.50	2.20	0.56	2.47	0.01	0.03	0.11	0.50
CE-02	2E	02-OxCat	Caterpillar G3516B Engine	1,380 bhp	1.52	6.66	0.50	2.20	0.56	2.47	0.01	0.03	0.11	0.50
CE-03	3E	01-NSCR	Caterpillar G3306B TA Engine	203 bhp	0.20	0.90	0.89	3.89	0.20	0.86	1.1E-03	4.8E-03	0.04	0.16
RBV-1	4E	na	Dehydrator Reboiler 01	1.66 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
RSV-1	5E	01-COMB	Dehydrator Still Vent 01	60 MMscfd	---	---	---	---	0.68	2.97	---	---	---	---
	6E	01-COMB	Dehydrator Flash Tank 01		---	---	---	---	0.43	1.88	---	---	---	---
RBV-2	7E	na	Dehydrator Reboiler 02	1.66 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
RSV-2	8E	01-COMB	Dehydrator Still Vent 02	60 MMscfd	---	---	---	---	0.68	2.97	---	---	---	---
	9E	01-COMB	Dehydrator Flash Tank 02		---	---	---	---	0.43	1.88	---	---	---	---
COMB-1	10E	na	Thermal Oxidizer 01	6.41 MMBtu/hr	0.44	1.91	1.99	8.71	See RSV-1 and -2		3.8E-03	0.02	0.05	0.21
HTR-01	11E	na	Heater Treater 01	1.55 MMBtu/hr	0.15	0.67	0.13	0.56	0.01	0.04	9.1E-04	4.0E-03	0.01	0.05
HTR-02	12E	na	Condensate Stabilizer Heater 01	2.55 MMBtu/hr	0.25	1.10	0.21	0.92	0.01	0.06	1.5E-03	0.01	0.02	0.08
T01	13E	na	Produced Water Tank 01	48 bbl	---	---	---	---	0.03	0.14	---	---	---	---
TLO-1	14E	na	Truck Load-Out 01 - Prod. Water	10,400 gal/yr	---	---	---	---	---	0.45	---	---	---	---
TLO-2	15E	na	Truck Load-Out 02 - Stab. Cond.	250,000 gal/yr	---	---	---	---	---	2.47	---	---	---	---
SSM***	16E	na	<b>Start/Stop/Maintenance (Blowdown)</b>	<b>3,363 bhp</b>	---	---	---	---	---	<b>42.84</b>	---	---	---	---
RPC**	18E	na	<b>Rod Packing/Crankcase Leaks</b>	<b>5 Recips</b>	---	---	---	---	<b>6.32</b>	<b>27.66</b>	---	---	---	---
HTR-03	19E	na	Station Recycle Line Heater 01	1.66 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
HTR-04	20E	na	Condensate Stabilizer Heater 02	9.7 MMBtu/hr	0.95	4.17	0.80	3.50	0.05	0.24	0.01	0.02	0.07	0.32
T02	21E	na	Produced Water Tank 02	210 bbl	---	---	---	---	0.14	0.62	---	---	---	---
<b>TOTAL POINT SOURCE PTE:</b>					<b>5.53</b>	<b>24.20</b>	<b>5.43</b>	<b>23.78</b>	<b>10.13</b>	<b>90.14</b>	<b>0.03</b>	<b>0.13</b>	<b>0.45</b>	<b>1.98</b>
<b>WV-DEP Permit Threshold:</b>					6 lb/hr <b><u>AND</u></b> 10 tpy		6 lb/hr <b><u>AND</u></b> 10 tpy		6 lb/hr <b><u>AND</u></b> 10 tpy		6 lb/hr <b><u>AND</u></b> 10 tpy		6 lb/hr <b><u>AND</u></b> 10 tpy	
<b>Title V Permit Threshold:</b>					---	100	---	100	---	100	---	100	---	100

FUG-G	17E	na	Process Piping Fugitives - Gas	1,953 fittings	---	---	---	---	2.40	10.52	---	---	---	---
FUG-L			Process Piping Fugitives - Liquid	2,468 fittings	---	---	---	---	6.71	29.41	---	---	---	---
<b>TOTAL FUGITIVE SOURCE PTE:</b>					---	---	---	---	<b>9.12</b>	<b>39.93</b>	---	---	---	---

Grey/Bold cells indicate  
New or Modified Sources

<b>TOTAL PTE:</b>	<b>5.53</b>	<b>24.20</b>	<b>5.43</b>	<b>23.78</b>	<b>19.25</b>	<b>130.06</b>	<b>0.03</b>	<b>0.13</b>	<b>0.45</b>	<b>1.98</b>
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Notes: \*\* RPC was previously designated FUG2. Includes Compressor Rod Packing Leaks and Engine Crankcase Leaks.  
 \*\*\* SSM emissions are vented thru a "Dispersion Stack". Including Blowdown, Purge Gas and Condensate Filter Change-Out Emissions.

- 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM) and Truck Load-Out (TLO-1 and -2) emission generating activities are infrequent.
- 2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).
- 3 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
- 4 - Fugitive **criteria pollutant emissions** are **not** considered in major source determinations (45CSR30 Section 2.26.b.)

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment N - Supporting Emissions Calculations**

**Controlled Emissions - Hazardous Air Pollutants (HAP)**

Unit ID	Point ID	Benzene		Ethylbenzene		HCHO (HAP)		n-Hexane		Methanol		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP		
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
CE-01	1E	4.6E-04	2.0E-03	4.2E-05	1.8E-04	0.27	1.17	1.2E-03	0.01	2.6E-03	0.01	4.3E-04	1.9E-03	2.6E-04	1.2E-03	1.9E-04	8.5E-04	0.02	0.07	0.29	1.26	
CE-02	2E	4.6E-04	2.0E-03	4.2E-05	1.8E-04	0.27	1.17	1.2E-03	0.01	2.6E-03	0.01	4.3E-04	1.9E-03	2.6E-04	1.2E-03	1.9E-04	8.5E-04	0.02	0.07	0.29	1.26	
CE-03	3E	2.9E-03	1.3E-02	4.6E-05	2.0E-04	0.09	0.39	---	---	5.7E-03	0.02	1.0E-03	4.5E-03	---	---	3.6E-04	1.6E-03	0.01	0.05	0.11	0.49	
RBV-1	4E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	3.1E-06	1.4E-05	3.1E-03	0.01	
RSV-1	5E	0.02	0.08	2.0E-02	8.8E-02	---	---	0.01	0.06	---	---	0.09	0.39	0.01	0.04	0.19	0.82	---	---	0.34	1.48	
	6E	5.6E-04	2.5E-03	2.4E-04	1.0E-03	---	---	0.01	0.04	---	---	1.7E-03	0.01	0.01	0.03	1.6E-03	0.01	---	---	0.02	0.09	
RBV-2	7E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	0.00	0.00	3.1E-03	0.01	
RSV-2	8E	0.02	0.08	0.02	0.09	---	---	0.01	0.06	---	---	0.09	0.39	0.01	0.04	0.19	0.82	---	---	0.34	1.48	
	9E	5.6E-04	2.5E-03	2.4E-04	1.0E-03	---	---	0.01	0.04	---	---	1.7E-03	0.01	0.01	0.03	1.6E-03	0.01	---	---	0.02	0.09	
COMB-1	10E	See RSV-1 and -2		See RSV-1 and -2		4.7E-04	2.1E-03	See RSV-1 and -2		---	---	See RSV-1 and -2		See RSV-1 and -2		See RSV-1 and -2		1.2E-05	5.2E-05	4.8E-04	2.1E-03	
HTR-01	11E	3.2E-06	1.4E-05	---	---	1.1E-04	5.0E-04	2.7E-03	0.01	---	---	5.2E-06	2.3E-05	---	---	---	---	2.9E-06	1.3E-05	2.9E-03	0.01	
HTR-02	12E	5.3E-06	2.3E-05	---	---	1.9E-04	8.2E-04	4.5E-03	0.02	---	---	8.5E-06	3.7E-05	---	---	---	---	4.7E-06	2.1E-05	4.7E-03	0.02	
T01	13E	1.6E-03	0.01	1.6E-03	0.01	---	---	1.6E-03	0.01	---	---	1.6E-03	0.01	1.6E-03	0.01	1.6E-03	0.01	---	---	0.01	0.04	
TLO-1	14E	---	2.2E-02	---	2.2E-02	---	---	---	2.2E-02	---	---	---	2.2E-02	---	2.2E-02	---	2.2E-02	---	---	---	0.13	
TLO-2	15E	---	0.03	---	0.03	---	---	---	0.03	---	---	---	0.03	---	0.03	---	0.03	---	---	---	0.21	
SSM***	16E	---	0.02	---	0.02	---	---	---	1.10	---	---	---	0.09	---	0.54	---	0.13	---	---	---	1.89	
FUG-G	17E	0.01	0.06	0.01	0.06	---	---	0.01	0.06	---	---	0.01	0.06	0.01	0.06	0.01	0.06	---	---	0.08	0.36	
FUG-L		0.10	0.42	0.10	0.42	---	---	0.10	0.42	---	---	0.10	0.42	0.10	0.42	0.10	0.42	0.10	0.42	---	---	0.57
RPC**	18E	0.04	0.16	0.04	0.16	0.02	0.09	0.04	0.16	---	---	0.04	0.16	0.04	0.16	0.04	0.16	---	---	0.24	1.05	
HTR-03	19E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	3.1E-06	1.4E-05	3.1E-03	0.01	
HTR-04	20E	2.0E-05	8.7E-05	---	---	7.1E-04	3.1E-03	0.02	0.07	---	---	3.2E-05	1.4E-04	---	---	---	---	1.8E-05	7.9E-05	0.02	0.08	
T02	21E	7.0E-03	0.03	7.0E-03	0.03	---	---	7.0E-03	0.03	---	---	7.0E-03	0.03	7.0E-03	0.03	7.0E-03	0.03	---	---	0.04	0.18	
<b>TOTAL PTE:</b>		<b>0.20</b>	<b>0.94</b>	<b>0.20</b>	<b>0.93</b>	<b>0.64</b>	<b>2.82</b>	<b>0.24</b>	<b>2.19</b>	<b>0.01</b>	<b>0.05</b>	<b>0.34</b>	<b>1.62</b>	<b>0.19</b>	<b>1.42</b>	<b>0.53</b>	<b>2.52</b>	<b>0.04</b>	<b>0.19</b>	<b>2.38</b>	<b>12.68</b>	
<b>WV-DEP:</b>		<b>2 lb/hr</b>	<b>OR 0.5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	<b>2 lb/hr</b>	<b>OR 0.5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	<b>3 lb/hr</b>	<b>OR 5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	<b>3 lb/hr</b>	<b>OR 5 tpy</b>	<b>2 lb/hr</b>	<b>OR 5 tpy</b>	
<b>Title V:</b>		---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	25	

**Grey/Bold cells indicate  
New or Modified Sources**

Notes: \*\* RPC was previously designated FUG2. Includes Compressor Rod Packing Leaks and Engine Crankcase Leaks.  
 \*\*\* SSM emissions are vented thru a "Dispersion Stack". Including Blowdown, Purge Gas and Condensate Filter Change-Out Emissions.

- 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM) and Truck Load-Out (TLO-1 and -2) emission generating activities are infrequent.
- 2 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment N - Supporting Emissions Calculations**  
**Greenhouse Gas (GHG) Emissions**

Unit ID	Point ID	Control ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 53.06		kg/MMBtu: 1.00E-03		kg/MMBtu: 1.00E-04		TOTAL CO2e tpy
						GWP: CO2 tpy	CO2e tpy	GWP: CH4 tpy	CO2e tpy	GWP: N2O tpy	CO2e tpy	
CE-01	1E	01-OxCat	Caterpillar G3516B Engine	11.41	8,760	6,876	6,876	26	656	0.01	3	7,536
CE-02	2E	02-OxCat	Caterpillar G3516B Engine	11.41	8,760	6,876	6,876	26	656	0.01	3	7,536
CE-03	3E	01-NSCR	Caterpillar G3306B TA Engine	1.86	8,760	1,113	1,113	1	21	1.8E-03	1	1,135
RBV-1	4E	na	Dehydrator Reboiler 01	1.66	8,760	857	857	0.02	0.4	0.02	4.7	862
RSV-1	5E	01-COMB	Dehydrator Still Vent 01	---	8,760	---	---	0.04	1	---	---	1
	6E	01-COMB	Dehydrator Flash Tank 01	---	8,760	---	---	1	24	---	---	24
RBV-2	7E	na	Dehydrator Reboiler 02	1.66	8,760	857	857	0.02	0.4	0.02	4.7	862
RSV-2	8E	01-COMB	Dehydrator Still Vent 02	---	8,760	---	---	0.04	1	---	---	1
	9E	01-COMB	Dehydrator Flash Tank 02	---	8,760	---	---	1	24	---	---	24
COMB-1	10E	na	Thermal Oxidizer 01	6.41	8,760	3,304	3,304	---	---	0.06	18	3,322
HTR-01	11E	na	Heater Treater 01	1.55	8,760	800	800	0.02	0	0.01	4	805
HTR-02	12E	na	Condensate Stabilizer Heater 01	2.55	8,760	1,314	1,314	0.03	1	0.02	7	1,322
T01	13E	na	Produced Water Tank 01	---	8,760	---	---	---	---	---	---	---
TLO-1	14E	na	Truck Load-Out 01 - Prod. Water	---	8,760	---	---	---	---	---	---	---
TLO-2	15E	na	Truck Load-Out 02 - Stab. Cond.	---	8,760	---	---	---	---	---	---	---
SSM***	16E	na	Start/Stop/Maintenance (Blowdown)	---	8,760	---	---	75	1,886	---	---	1,886
FUG-G	17E	na	Process Piping Fugitives - Gas	---	8,760	0.15	0.15	35	863	---	---	863
FUG-L			Process Piping Fugitives - Liquid	---	8,760	0.00	0.00	0.12	2.97	---	---	3
RPC**	18E	na	Rod Packing/Crankcase Leaks	---	8,760	128	128	64	1,609	---	---	1,738
HTR-03	19E	na	Station Recycle Line Heater 01	1.66	8,760	857	857	0.02	0	0.02	5	862
HTR-04	20E	na	Condensate Stabilizer Heater 02	9.70	8,760	4,999	4,999	0.10	2	0.09	27	5,029
T02	21E	na	Produced Water Tank 02	---	8,760	---	---	---	---	---	---	---

<b>TOTAL FACILITY-WIDE PTE:</b>	<b>27,982</b>		<b>230</b>		<b>0.26</b>		<b>33,808</b>
<b>WV-DEP Threshold:</b>	na	- OR -	na	- OR -	na	- AND -	na
<b>Title V Permit Threshold:</b>	na		na		na		na

- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except TLO and SSM emissions are intermittent (and infrequent).  
 2 - Engine CO2 and CH4 emissions are based on vendor specifications.  
 3 - Dehydrator CH4 emissions are based on "Worst Case" GRI-GLYCalc Model Output.  
 4 - SSM CH4 emissions are based on vendor specifications and operational experience.  
 5 - Fugitive CH4 emissions are based on EPA Fugitive Emission Factors for Oil and Gas Production Operations.  
 6 - All other GHG emissions are based on default values in 40CFR98, Subpart C, Table C-1.  
 7 - CO2e is aggregated Greenhouse Gas (GHG), comprised of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), as adjusted for Global Warming Potential (GWP).  
**8 - WV-DEP and Title V Permit Major Source Thresholds are applicable only if other regulated air pollutants exceed the corresponding Thresholds.**

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment N - Supporting Emissions Calculations**

**PRE-Controlled Emissions - Criteria Pollutants**

Unit ID	Point ID	Control ID	Description	Design Capacity	NOx		CO		VOC		SOx		PM10/2.5	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	1E	01-OxCat	Caterpillar G3516B Engine	1,380 bhp	1.52	6.66	9.37	41.04	4.32	18.92	0.01	0.03	0.11	0.50
CE-02	2E	02-OxCat	Caterpillar G3516B Engine	1,380 bhp	1.52	6.66	9.37	41.04	4.32	18.92	0.01	0.03	0.11	0.50
CE-03	3E	01-NSCR	Caterpillar G3306B TA Engine	203 bhp	6.83	29.91	6.83	29.91	0.20	0.86	1.1E-03	4.8E-03	0.04	0.16
RBV-1	4E	na	Dehydrator Reboiler 01	1.7 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
RSV-1	5E	01-COMB	Dehydrator Still Vent 01	60 MMscfd	---	---	---	---	67.77	296.83	---	---	---	---
	6E	01-COMB	Dehydrator Flash Tank 01		---	---	---	---	43.01	188.38	---	---	---	---
RBV-2	7E	na	Dehydrator Reboiler 02	1.7 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
RSV-2	8E	01-COMB	Dehydrator Still Vent 02	60 MMscfd	---	---	---	---	67.77	296.83	---	---	---	---
	9E	01-COMB	Dehydrator Flash Tank 02		---	---	---	---	43.01	188.38	---	---	---	---
COMB-1	10E	na	Thermal Oxidizer 01	6.4 MMBtu/hr	na									
HTR-01	11E	na	Heater Treater 01	1.55 MMBtu/hr	0.15	0.67	0.13	0.56	0.01	0.04	9.1E-04	4.0E-03	0.01	0.05
HTR-02	12E	na	Condensate Stabilizer Heater 01	2.55 MMBtu/hr	0.25	1.10	0.21	0.92	0.01	0.06	0.02	0.08	0.02	0.08
T01	13E	na	Produced Water Tank 01	48 bbl	---	---	---	---	0.03	0.14	---	---	---	---
TLO-1	14E	na	Truck Load-Out 01 - Prod. Water	10,400 gal/yr	---	---	---	---	---	0.45	---	---	---	---
TLO-2	15E	na	Truck Load-Out 02 - Stab. Cond.	250,000 gal/yr	---	---	---	---	---	2.47	---	---	---	---
SSM***	16E	na	Start/Stop/Maintenance (Blowdown)	3,363 bhp	---	---	---	---	---	42.84	---	---	---	---
RPC**	18E	na	Rod Packing/Crankcase Leaks	5 Recips	---	---	---	---	6.32	27.66	---	---	---	---
HTR-03	19E	na	Station Recycle Line Heater 01	1.66 MMBtu/hr	0.16	0.71	0.14	0.60	0.01	0.04	9.8E-04	4.3E-03	0.01	0.05
HTR-04	20E	na	Condensate Stabilizer Heater 02	9.7 MMBtu/hr	0.95	4.17	0.80	3.50	0.05	0.24	0.01	0.02	0.07	0.32
T02	21E	na	Produced Water Tank 02	210 bbl	---	---	---	---	0.14	0.62	---	---	---	---
<b>TOTAL POINT SOURCE PTE:</b>					<b>11.71</b>	<b>51.31</b>	<b>27.12</b>	<b>118.78</b>	<b>236.99</b>	<b>1,083.75</b>	<b>0.04</b>	<b>0.19</b>	<b>0.40</b>	<b>1.77</b>
WV-DEP Permit Threshold:					6 lb/hr	<u>AND</u> 10 tpy	6 lb/hr	<u>AND</u> 10 tpy	6 lb/hr	<u>AND</u> 10 tpy	6 lb/hr	<u>AND</u> 10 tpy	6 lb/hr	<u>AND</u> 10 tpy
Title V Permit Threshold:					---	100	---	100	---	100	---	100	---	100

FUG-G	17E	na	Process Piping Fugitives - Gas	---	---	---	---	2.40	10.52	---	---	---	---
FUG-L			Process Piping Fugitives - Liquid	---	---	---	---	6.71	29.41	---	---	---	---
<b>TOTAL FUGITIVE SOURCE PTE:</b>					<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>9.12</b>	<b>39.93</b>	<b>---</b>	<b>---</b>	<b>---</b>

<b>TOTAL PTE:</b>					<b>11.71</b>	<b>51.31</b>	<b>27.12</b>	<b>118.78</b>	<b>246.10</b>	<b>1123.68</b>	<b>0.04</b>	<b>0.19</b>	<b>0.40</b>	<b>1.77</b>
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Grey/Bold cells indicate  
New or Modified Sources

Notes: \*\* RPC was previously designated FUG2. Includes Compressor Rod Packing Leaks and Engine Crankcase Leaks.

\*\*\* SSM emissions are vented thru a "Dispersion Stack". Including Blowdown, Purge Gas and Condensate Filter Change-Out Emissions.

1 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).

2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.

3 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

4 - Fugitive emissions are not considered in major source determinations (45CSR30 Section 2.26.b.)

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
 Application for 45CSR13 NSR Modification Permit  
**Attachment N - Supporting Emissions Calculations**

**PRE-Controlled Emissions - Hazardous Air Pollutants (HAP)**

Unit ID	Point ID	Benzene		Ethylbenzene		HCHO (HAP)		n-Hexane		Methanol		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP			
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy		
CE-01	1E	0.01	0.02	4.5E-04	2.0E-03	1.10	4.80	0.01	0.06	0.03	0.12	4.7E-03	0.02	2.9E-03	0.01	2.1E-03	0.01	0.16	0.72	1.32	5.76		
CE-02	2E	0.01	0.02	4.5E-04	2.0E-03	1.10	4.80	0.01	0.06	0.03	0.12	4.7E-03	0.02	2.9E-03	0.01	2.1E-03	0.01	0.16	0.72	1.32	5.76		
CE-03	3E	2.9E-03	1.3E-02	4.6E-05	2.0E-04	0.09	0.39	---	---	5.7E-03	0.02	1.0E-03	4.5E-03	---	---	3.6E-04	1.6E-03	0.01	0.05	0.11	0.49		
RBV-1	4E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	3.1E-06	1.4E-05	3.1E-03	0.01		
RSV-1	5E	1.91	8.35	2.02	8.83	---	---	1.34	5.85	---	---	8.80	38.55	0.99	4.36	18.79	82.28	---	---	33.84	148.23		
	6E	0.06	0.25	0.02	0.10	---	---	0.98	4.27	---	---	0.17	0.76	0.71	3.13	0.16	0.70	---	---	2.10	9.21		
RBV-2	7E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	0.00	0.00	3.1E-03	0.01		
RSV-2	8E	1.91	8.35	2.02	8.83	---	---	1.34	5.85	---	---	8.80	38.55	0.99	4.36	18.79	82.28	---	---	33.84	148.23		
	9E	0.06	0.25	0.02	0.10	---	---	0.98	4.27	---	---	0.17	0.76	0.71	3.13	0.16	0.70	---	---	2.10	9.21		
COMB-1	10E	na																					
HTR-01	11E	3.2E-06	1.4E-05	---	---	1.1E-04	5.0E-04	2.7E-03	0.01	---	---	5.2E-06	2.3E-05	---	---	---	---	2.9E-06	1.3E-05	2.9E-03	0.01		
HTR-02	12E	5.3E-06	2.3E-05	---	---	1.9E-04	8.2E-04	4.5E-03	0.02	---	---	8.5E-06	3.7E-05	---	---	---	---	4.7E-06	2.1E-05	4.7E-03	0.02		
T01	13E	1.6E-03	0.01	1.6E-03	0.01	---	---	1.6E-03	0.01	---	---	1.6E-03	0.01	1.6E-03	0.01	1.6E-03	0.01	---	---	0.01	0.04		
TLO-1	14E	---	2.2E-02	---	2.2E-02	---	---	---	2.2E-02	---	---	---	2.2E-02	---	2.2E-02	---	2.2E-02	---	---	---	0.13		
TLO-2	15E	---	3.5E-02	---	3.5E-02	---	---	---	3.5E-02	---	---	---	3.5E-02	---	3.5E-02	---	3.5E-02	---	---	---	0.21		
SSM***	16E	---	0.02	---	0.02	---	---	---	1.10	---	---	---	0.09	---	0.54	---	0.13	---	---	---	1.89		
FUG-G	17E	1.4E-02	0.06	1.4E-02	0.06	---	---	1.4E-02	0.06	---	---	1.4E-02	0.06	1.4E-02	0.06	1.4E-02	0.06	1.4E-02	0.06	---	---	0.08	0.36
FUG-L		0.10	0.42	0.10	0.42	---	---	0.10	0.42	---	---	0.10	0.42	0.10	0.42	0.10	0.42	0.10	0.42	---	---	0.57	2.50
RPC**	18E	0.04	0.16	0.04	0.16	0.02	0.09	0.04	0.16	---	---	0.04	0.16	0.04	0.16	0.04	0.16	---	---	0.24	1.05		
HTR-03	19E	3.4E-06	1.5E-05	---	---	1.2E-04	5.4E-04	2.9E-03	0.01	---	---	5.5E-06	2.4E-05	---	---	---	---	3.1E-06	1.4E-05	3.1E-03	0.01		
HTR-04	20E	2.0E-05	8.7E-05	---	---	7.1E-04	3.1E-03	0.02	0.07	---	---	3.2E-05	1.4E-04	---	---	---	---	1.8E-05	7.9E-05	0.02	0.08		
T02	21E	7.0E-03	0.03	7.0E-03	0.03	---	---	7.0E-03	0.03	---	---	7.0E-03	0.03	7.0E-03	0.03	7.0E-03	0.03	---	---	0.04	0.18		

<b>TOTAL PTE:</b>	<b>4.09</b>	<b>18.00</b>	<b>4.24</b>	<b>18.63</b>	<b>2.30</b>	<b>10.08</b>	<b>4.84</b>	<b>22.34</b>	<b>0.06</b>	<b>0.27</b>	<b>18.12</b>	<b>79.50</b>	<b>3.58</b>	<b>16.26</b>	<b>38.05</b>	<b>166.84</b>	<b>0.34</b>	<b>1.49</b>	<b>75.61</b>	<b>333.42</b>
WV-DEP:	2 lb/hr	<u>OR</u> 0.5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 0.5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy	2 lb/hr	<u>OR</u> 5 tpy
Title V:	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10

**Grey/Bold cells indicate  
New or Modified Sources**

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM) and Truck Load-Out (TLO-1 and -2) emission generating activities are infrequent.

\*\* RPC was previously designated FUG2. Includes Compressor Rod Packing Leaks and Engine Crankcase Leaks.

\*\*\* SSM emissions are vented thru a "Dispersion Stack". Including Blowdown, Purge Gas and Condensate Filter Change-Out Emissions.

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**Attachment N - Supporting Emissions Calculations**

**Compressor Engine 01 and 02 – 1,380 bhp CAT G3516B (4SLB)**

Unit ID	Description	Reference	Pollutant	Pre-Controlled Emissions				Control Efficiency	Controlled Emissions			
				g/bhp-hr	lb/MMBtu	lb/hr	tpy		g/bhp-hr	lb/MMBtu	lb/hr	tpy
CE-01/1E CE-02/2E (each)	Engines 01 thru 02  Caterpillar (CAT) G3516B 1,380 bhp (Site Rating) 1,400 rpm 4SLB / AFRC EMIT OxCat NSPS JJJJ Affected 8,760 hr/yr 920 Btu/scf (LHV) 1,020 Btu/scf (HHV) 7,442 Btu/bhp-hr (LHV) 8,264 Btu/bhp-hr (HHV) 10.27 MMBtu/hr (LHV) 11.41 MMBtu/hr (HHV) 89,965 MMBtu/yr (LHV) 99,961 MMBtu/yr (HHV) 11,163 scf/hr 0.27 MMscfd 1.88 MMscf/wk 97.79 MMscf/yr	Vendor Guarantee	NOx	0.50	0.13	1.52	6.66	---	0.50	0.13	1.52	6.66
		Vendor Guarantee	CO	3.08	0.82	9.37	41.04	94.6%	0.17	0.04	0.50	2.20
		Vendor Guarantee	THC	3.97	1.06	12.08	52.90	24.2%	3.01	0.80	9.15	40.08
		Vendor Guarantee	NMHC	2.00	0.53	6.08	26.65	48.1%	1.04	0.28	3.16	13.83
		Vendor Guarantee	NMNEHC	1.06	0.28	3.22	14.13	90.8%	0.10	0.03	0.30	1.30
		NMNEHC+HCHO	VOC	1.42	0.38	4.32	18.92	86.9%	0.19	0.05	0.56	2.47
		AP-42 Table 3.2-2	SOx	2.2E-03	5.9E-04	0.01	0.03	---	2.2E-03	5.9E-04	0.01	0.03
		AP-42 Table 3.2-2	PM10/2.5	0.04	0.01	0.11	0.50	---	0.04	0.01	0.11	0.50
		AP-42 Table 3.2-2	Benzene	1.6E-03	4.4E-04	0.01	0.02	90.8%	1.5E-04	4.1E-05	4.6E-04	2.0E-03
		AP-42 Table 3.2-2	Ethylbenzene	1.5E-04	4.0E-05	4.5E-04	2.0E-03	90.8%	1.4E-05	3.7E-06	4.2E-05	1.8E-04
		Vendor Guarantee	HCHO	0.36	0.10	1.10	4.80	75.7%	0.09	0.02	0.27	1.17
		AP-42 Table 3.2-2	n-Hexane	4.2E-03	1.1E-03	0.01	0.06	90.8%	3.8E-04	1.0E-04	1.2E-03	0.01
		AP-42 Table 3.2-2	Methanol	0.01	2.5E-03	0.03	0.12	90.8%	8.7E-04	2.3E-04	2.6E-03	0.01
		AP-42 Table 3.2-2	Toluene	1.5E-03	4.1E-04	4.7E-03	0.02	90.8%	1.4E-04	3.8E-05	4.3E-04	1.9E-03
		AP-42 Table 3.2-2	2,2,4-TMP	9.4E-04	2.5E-04	2.9E-03	0.01	90.8%	8.7E-05	2.3E-05	2.6E-04	1.2E-03
		AP-42 Table 3.2-2	Xylenes	6.9E-04	1.8E-04	2.1E-03	0.01	90.8%	6.4E-05	1.7E-05	1.9E-04	8.5E-04
		AP-42 Table 3.2-2	Other HAP	0.05	0.01	0.16	0.72	90.8%	5.0E-03	1.3E-03	0.02	0.07
		Sum	Total HAP	0.43	0.12	1.32	5.76	78.2%	0.09	0.03	0.29	1.26
		Vendor Guarantee	CO2	516	117	1,570	6,876	---	516	117	1,570	6,876
		THC-NMHC	CH4	1.97	0.53	5.99	26.25	---	1.97	0.53	5.99	26.25
40CFR98 - Table C-2	N2O	8.3E-04	2.2E-04	2.5E-03	0.01	---	8.3E-04	2.2E-04	2.5E-03	0.01		
40CFR98 - Table A-1	CO2e	565	130	1,720	7,536	---	565	130	1,720	7,536		

- Notes:
- 1 - The emissions are based on operation at 100% of rated load for 8,760 hrs/yr.
  - 2 - As per vendor specifications, emission values of NOx, CO, NMNEHC, and CO2 are "Not to Exceed" (i.e., vendor guarantee).
  - 3 - As per vendor specifications, THC, NMHC, and NMNEHC (non-methane/non-ethane hydrocarbon) do not include HCHO. VOC is the sum of NMNEHC and HCHO.
  - 4 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5
  - 5 - HCHO is formaldehyde; Total HAP includes, but not limited to, HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), 2,2,4-TMP, acetaldehyde, acrolein, and methanol.
  - 6 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.
  - 7 - Only the calculations based on vendor guarantees should be used to establish emission limitations.

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**Attachment N - Supporting Emissions Calculations**

**Compressor Engine 03 – 203 bhp CAT G3306B (4SRB)**

Unit ID	Description	Reference	Pollutant	Pre-Controlled Emissions				Control Efficiency	Controlled Emissions				
				g/bhp-hr	lb/MMBtu	lb/hr	tpy		g/bhp-hr	lb/MMBtu	lb/hr	tpy	
CE-03/3E	<b>Engine 03</b> <b>Caterpillar (CAT)</b> <b>G3306B TA</b> <b>203 bhp (Site Rating)</b> 1,800 rpm 4SRB / AFRC Miratech NSCR NSPS JJJJ Affected <b>8,760 hr/yr</b> 920 Btu/scf (LHV) 1,022 Btu/scf (HHV) <b>8,240 Btu/bhp-hr (LHV)</b> 9,070 Btu/bhp-hr (HHV) 1.67 MMBtu/hr (LHV) 1.86 MMBtu/hr (HHV) 14,653 MMBtu/yr (LHV) 16,281 MMBtu/yr (HHV) 1,818 scf/hr 0.04 MMscfd 0.31 MMscf/wk 15.93 MMscf/yr	Vendor Guarantee	NOx	15.26	3.71	6.83	29.91	97.0%	0.50	0.11	0.20	0.90	
		Vendor Guarantee	CO	15.26	3.71	6.83	29.91	87.0%	2.00	0.48	0.89	3.89	
		Vendor Guarantee	THC	0.87	0.21	0.39	1.71	---	0.87	0.21	0.39	1.71	
		Vendor Guarantee	NMHC	0.44	0.11	0.20	0.86	---	0.44	0.11	0.20	0.86	
		Vendor Guarantee	NMNEHC	0.24	0.06	0.11	0.47	---	0.24	0.06	0.11	0.47	
		NMNEHC+HCHO	VOC	0.44	0.11	0.20	0.86	---	0.44	0.11	0.20	0.86	
		AP-42 Table 3.2-3	SOx	2.4E-03	5.9E-04	1.1E-03	4.8E-03	---	2.4E-03	5.9E-04	1.1E-03	4.8E-03	
		AP-42 Table 3.2-3	PM10/2.5	0.08	0.02	0.04	0.16	---	0.08	0.02	0.04	0.16	
		AP-42 Table 3.2-3	Benzene	0.01	1.6E-03	0.00	0.01	---	0.01	1.6E-03	2.9E-03	1.3E-02	
		AP-42 Table 3.2-3	Ethylbenzene	1.0E-04	2.5E-05	4.6E-05	2.0E-04	---	1.0E-04	2.5E-05	4.6E-05	2.0E-04	
		Vendor Guarantee	HCHO	0.20	0.05	0.09	0.39	---	0.20	0.05	0.09	0.39	
		AP-42 Table 3.2-3	n-Hexane	---	---	---	---	---	---	---	---	---	
		AP-42 Table 3.2-3	Methanol	0.01	3.1E-03	0.01	0.02	---	1.3E-02	3.1E-03	5.7E-03	0.02	
		AP-42 Table 3.2-3	Toluene	2.3E-03	5.6E-04	1.0E-03	0.00	---	2.3E-03	5.6E-04	1.0E-03	4.5E-03	
		AP-42 Table 3.2-3	2,2,4-TMP	---	---	---	---	---	---	---	---	---	
		AP-42 Table 3.2-3	Xylenes	8.1E-04	1.95E-04	3.6E-04	0.00	---	8.1E-04	2.0E-04	3.6E-04	1.6E-03	
		AP-42 Table 3.2-3	Other HAP	0.03	0.01	0.01	0.05	---	0.03	0.01	0.01	0.05	
			Sum	Total HAP	0.25	0.06	0.11	0.49	---	0.25	0.06	0.11	0.49
		Vendor Guarantee	CO2	568	138	254	1,113	---	568	138.06	254	1,113	
		THC-NMHC	CH4	0.43	0.10	0.19	0.84	---	0.43	0.10	0.19	0.84	
40CFR98 - Table C-2	N2O	9.2E-04	2.2E-04	4.1E-04	1.8E-03	---	9.2E-04	2.2E-04	4.1E-04	1.8E-03			
40CFR98 - Table A-1	CO2e	579	141	259	1,135	---	579	141	259	1,135			

- Notes:
- 1 - The emissions are based on operation at 100% of rated load for 8,760 hrs/yr.
  - 2 - As per vendor specifications, emission values of NOx, CO, NMNEHC, and CO2 are "Not to Exceed" (i.e., vendor guarantee).
  - 3 - As per vendor specifications, THC, NMHC, and NMNEHC (non-methane/non-ethane hydrocarbon) do not include HCHO. VOC is the sum of NMNEHC and HCHO.
  - 4 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5
  - 5 - HCHO is formaldehyde; Total HAP includes, but not limited to, HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), 2,2,4-TMP, acetaldehyde, acrolein, and methanol.
  - 6 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.
  - 7 - Only the calculations based on vendor guarantees should be used to establish emission limitations.



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**Attachment N - Supporting Emissions Calculations**  
**Rod Packing/Crankcase Leaks (RPC)**

**Rod Packing Leaks (Natural Gas)**

Unit ID	Unit Description	Number of Compressors*	Cyl's per Compressor	scfh per Cyl	Contingency	Total Fugitive Leak Rate MMscf/yr	VOC		HCHO		n-Hex, BTEX, 2,2,4-TMP (ea)		Total HAP		CO2		CH4		CO2e	
							18,074 lb/MMscf	lb/hr tpy	na lb/MMscf	lb/hr tpy	105 lb/MMscf	lb/hr tpy	627 lb/MMscf	lb/hr tpy	262 lb/MMscf	lb/hr tpy	42,275 lb/MMscf	lb/hr tpy	1,057,137 lb/MMscf	lb/hr tpy
RPC	Rod Packing Leaks	5	4	15	15%	3.02	6.24	27.31	na	na	0.04	0.16	0.22	0.95	0.1	0.4	15	64	365	1,597

\* Includes Two (2) 200 bhp Electric Motor Driven Compressors

**Crankcase Emissions (Combustion Gas)**

Unit ID	Unit Description	Total Reciprocating Engine Horsepower (bhp)	Crankcase Leak Rate 0.50 scf/bhp-hr MMscf/yr	Safety Factor	VOC		HCHO		n-Hex, BTEX, 2,2,4-TMP (ea)		Total HAP		CO2		CH4		CO2e	
					21.72 lb/MMscf	lb/hr tpy	5.51 lb/MMscf	lb/hr tpy	0.19 lb/MMscf	lb/hr tpy	6.62 lb/MMscf	lb/hr tpy	7,892 lb/MMscf	lb/hr tpy	30 lb/MMscf	lb/hr tpy	8,645 lb/MMscf	lb/hr tpy
RPC	Crankcase Emissions	2,963	12.98	250%	0.08	0.35	0.02	0.09	6.9E-04	3.0E-03	0.02	0.11	29	128	0	0	32	140

**TOTAL RPC EMISSIONS:**

VOC		HCHO		n-Hex, BTEX, 2,2,4-TMP (ea)		Total HAP		CO2		CH4		CO2e	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
6.32	27.66	0.02	0.09	0.04	0.16	0.24	1.05	29	128	15	64	397	1,738

Notes: 1 - Fugitive equipment leaks from misc. equipment is a broad category covering leaks of natural gas from sealed surfaces, such as packing and gaskets, resulting from the wear of mechanical joints, seals, and rotating surfaces over time.

2 - Emission are based upon 40CFR98, Subpart W and manufacturer's data.

3 - To be conservative, and to account for potential future changes, the following "worst-case" gas characteristics were assumed:

Pollutant	Gas Analysis	Worst-Case Assumption
CO2	218 lb/MMscf	262 lb/MMscf
CH4	30,195 lb/MMscf	42,275 lb/MMscf
VOC	15,061 lb/MMscf	18,074 lb/MMscf
BTEX (ea)	87 lb/MMscf	105 lb/MMscf
Total HAP	523 lb/MMscf	627 lb/MMscf

4 - Total Misc. Equipment Fugitive Leak Rate (scf/yr) =  
 No. of Compressors \* Cylinders/Compressor \*  
 scfh/Cylinder \* 8760 hr/yr \* (1 + Contingency)

5 - Total Facility-Wide bhp is determined as follows:

Unit ID	BHP	Prorated
CE-01 (8,760 hr/yr)	1,380	1,380
CE-02 (8,760 hr/yr)	1,380	1,380
CE-03 (8,760 hr/yr)	203	203
<b>TOTAL</b>	<b>2,963</b>	<b>2,963</b>

6 - Engine crankcase emissions are based on vendor data: "As a general rule, blow-by (i.e., crankcase emissions) on a new engine is approximately 0.5 scf/bhp-hr." A "safety factor" is used to account for increasing blow-by as the engines "wear".

7 - Crankcase emissions are estimated as follows:

(Data from CAT G3516B Data Sheet and Emissions Calculation Spreadsheet.)

Total Engine Exhaust (TEEx) (Volume)	9,268 ft3/min (acf/min)	1,743 MMscf/yr TEEx*
Pollutant	G3516B PTE	Crankcase Emission Factor**
Crankcase THC emissions (Mass)	52.90 tpy THC	60.72 lb THC / MMscf TEEx
Crankcase VOC emissions (Mass)	18.92 tpy VOC	21.72 lb VOC / MMscf TEEx
Crankcase HCHO emissions (Mass)	4.80 tpy HCHO	5.51 lb HCHO / MMscf TEEx
Crankcase BTEX (ea) emissions (Mass)	0.16 tpy BTEX (ea)	0.19 lb BTEX (ea) / MMscf TEEx
Crankcase HAP emissions (Mass)	5.76 tpy HAP	6.62 lb HAP / MMscf TEEx
Crankcase CO2 emissions (Mass)	6,876 tpy CO2	7,892 lb CO2 / MMscf TEEx
Crankcase CH4 emissions (Mass)	26 tpy CH4	30 lb CH4 / MMscf TEEx
Crankcase CO2e emissions (Mass)	7,536 tpy CO2e	8,649 lb CO2e / MMscf TEEx

\* Conversion from acf/min to scf/yr based on 8,760 hr/yr, 1016 oF exhaust temp, and 68 oF std temp.

\*\* Crankcase Emission Factor = PTE (tpy) from a G3516B Engine ÷ Total Engine Exhaust (TEEx) (MMscf/yr).

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**Startup, Shutdown and Maintenance (and Blowdown) (SSM)**

Unit ID	Description	No of Units	Total bhp	a. "Cold-Start" Gas		b. Blowdown Gas		Site-Wide SSM Events SSM/yr	Total Gas Vented MMscf/yr
				scf/Unit	scf/SSM	scf/bhp	scf/SSM		
SSM-Gas	Compressor Blowdown*	5	3,363	na	na	6.22	20,902	156	3.26
SSM-Gas	Purge Gas (Continuous @ 35 scf/hr)	na	na	na	na	na	35	8,760	0.31
SSM-Cond.	Filter Changeouts (Condensate)	2	na	na	na	na	20,362	4	0.08

\* Includes Two (2) 200 bhp Electric Motor Driven Compressors

Unit ID	VOC 18,074 - Gas 260,391 Cond. lb/MMscf tpy	Benzene 4.94 - Gas 222 - Cond. lb/MMscf tpy	Ethylbenzene 3.36 - Gas 255 - Cond. lb/MMscf tpy	n-Hexane 278 - Gas 14,920 - Cond. lb/MMscf tpy	Toluene 17.48 - Gas 1,468 - Cond. lb/MMscf tpy	2,2,4-TMP 300 - Gas 65 - Cond. lb/MMscf tpy	Xylenes 23.50 - Gas 2,045 - Cond. lb/MMscf tpy	Total HAP 627 - Gas 18,975 - Cond. lb/MMscf tpy	CH4 42,275 - Gas 903 - Cond. lb/MMscf tpy	CO2e 1,056,875 - Gas 22,587 - Cond. lb/MMscf tpy
SSM-Gas	29.47	0.01	5.5E-03	0.45	0.03	0.49	0.04	1.02	68.92	1,723
SSM-Gas	2.77	7.6E-04	5.1E-04	0.04	2.7E-03	4.6E-02	3.6E-03	0.10	6.48	162
SSM-Cond.	10.60	9.1E-03	1.0E-02	0.61	6.0E-02	2.6E-03	8.3E-02	0.77	0.04	1

<b>TOTAL SSM:</b>	<b>42.84</b>	<b>0.02</b>	<b>0.02</b>	<b>1.10</b>	<b>0.09</b>	<b>0.54</b>	<b>0.13</b>	<b>1.89</b>	<b>75.44</b>	<b>1,886</b>
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- Notes:
- 1 - SSM Emissions include natural gas blowdown from compressors and associated piping/equipment, purge gas used to prevent air from entering the line, and condensate filter change-outs.
  - 2 - Starting gas quantity and blowdown (B-D) gas quantity as per engineering department (e.g., 8,577 scf/B-D of a compressor with a 1,380 bhp engine equals 6.22 scf/bhp/B-D.)
  - 3 - To be conservative, the following gas characteristics were assumed:

Pollutant	Gas Analysis		Condensate Analysis	
	Actual	Assumed	Actual	Assumed
CH4	30,195 lb/MMscf	42,275 lb/MMscf	753 lb/MMscf	903 lb/MMscf
VOC	15,061 lb/MMscf	18,074 lb/MMscf	216,992 lb/MMscf	260,391 lb/MMscf
Benzene	4 lb/MMscf	4.94 lb/MMscf	185 lb/MMscf	222 lb/MMscf
E-benzene	3 lb/MMscf	3.36 lb/MMscf	213 lb/MMscf	255 lb/MMscf
n-Hexane	232 lb/MMscf	278 lb/MMscf	12,433 lb/MMscf	14,920 lb/MMscf
Toluene	15 lb/MMscf	17.48 lb/MMscf	1,224 lb/MMscf	1,468 lb/MMscf
2,2,4-TMP	250 lb/MMscf	300 lb/MMscf	54 lb/MMscf	65 lb/MMscf
Xylenes	20 lb/MMscf	23.50 lb/MMscf	1,704 lb/MMscf	2,045 lb/MMscf
Total HAP	523 lb/MMscf	627 lb/MMscf	15,813 lb/MMscf	18,975 lb/MMscf

- 4 - To be conservative, these SSM estimates are based on 3.0 facility-wide blowdowns each week.
- 5 - At Conner Compressor Station, the compressor blowdowns are routed to a dispersion stack.  
A continuous purge gas stream is used to prevent infiltration of air into the dispersion stack.  
The dispersion stack vendor estimates that 35 scf/hr of purge gas will be used.
- 6 - Two condensate vessels (370 gal and 320 gal) will have their filters changed-out up to four times per year.

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**Attachment N - Supporting Emissions Calculations**

**Reboilers 01 and 02 - 1.66 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
RBV-1/4E RBV-2/7E (Each)	<b>Reboiler 01 and 02</b>	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.16	0.71	na	0.16	0.71
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.14	0.60	na	0.14	0.60
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	0.01	0.04	na	0.01	0.04
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	9.8E-04	4.3E-03	na	9.8E-04	4.3E-03
	1.50 MMBtu/hr (LHV)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	1.2E-02	0.05	na	0.01	0.05
	<b>1.66 MMBtu/hr (HHV)</b>	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	3.4E-06	1.5E-05	na	3.4E-06	1.5E-05
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
	<b>8,760 hr/yr</b>	EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	1.2E-04	5.4E-04	na	1.2E-04	5.4E-04
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	2.9E-03	1.3E-02	na	2.9E-03	1.3E-02
	920 Btu/scf (LHV)	EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Toluene	0.00	3.33E-06	5.5E-06	2.4E-05	---	5.5E-06	2.4E-05
	1,020 Btu/scf (HHV)	EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	na	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
	1,630 scf/hr	EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	3.1E-06	1.4E-05	na	3.1E-06	1.4E-05
		EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	3.1E-03	0.01	na	3.1E-03	0.01
	39.13 Mscfd	EPA AP-42 Table 1.4-2	CO2	120,000	118	196	857	na	196	857
		EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	3.8E-03	0.02	na	3.8E-03	0.02
14.28 MMscf/yr	EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	3.6E-03	0.02	na	3.6E-03	0.02	
	40CFR98 - Table A-1	CO2e	120,713	118	197	862	na	197	862	

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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**Attachment N - Supporting Emissions Calculations**

**Dehydrators 01 and 02 (Still Vents and Flash Tanks) - 60 MMscfd**

Unit ID	Description	Capacity	Reference	Pollutant	GRI-GLYCalc Estimated Pre-Controlled Emissions		Worst-Case Pre-Controlled Emissions		Control Efficiency	Controlled Emissions	
					lb/hr	tpy	lb/hr	tpy		%	lb/hr
<b>RSV-1 RSV-2 (Each)</b>	Dehy 01 (RSV-1) Dehy 02 (RSV-2)  <b>Still Vent</b> (Still Vent Off-Gas is Routed to the Thermal Oxidizer) (Each)	Flow Rate <b>60</b> MMscfd  <b>8,760</b> hr/yr	GRI-GLYCalc 4.0	VOC	56.47	247.36	67.77	296.83	99%	<b>0.68</b>	<b>2.97</b>
			GRI-GLYCalc 4.0	Benzene	1.59	6.96	1.91	8.35	99%	<b>0.02</b>	<b>0.08</b>
			GRI-GLYCalc 4.0	Ethylbenzene	1.68	7.36	2.02	8.83	99%	<b>0.02</b>	<b>0.09</b>
			GRI-GLYCalc 4.0	n-Hexane	1.11	4.88	1.34	5.85	99%	<b>0.01</b>	<b>0.06</b>
			GRI-GLYCalc 4.0	Toluene	7.34	32.13	8.80	38.55	99%	<b>0.09</b>	<b>0.39</b>
			GRI-GLYCalc 4.0	2,2,4-TMP	0.83	3.63	0.99	4.36	99%	<b>0.01</b>	<b>0.04</b>
			GRI-GLYCalc 4.0	Xylenes	15.66	68.57	18.79	82.28	99%	<b>0.19</b>	<b>0.82</b>
			GRI-GLYCalc 4.0	Tot HAP	28.20	123.52	33.84	148.23	99%	<b>0.34</b>	<b>1.48</b>
			GRI-GLYCalc 4.0	CH4	1	4	1	4	99%	<b>0.01</b>	<b>0.04</b>
			40CFR98 - Table A-1	CO2e	20	88	24	106	99%	<b>0.24</b>	<b>1.06</b>
<b>RSV-1 RSV-2 (Each)</b>	Dehy 01 (RSV-1) Dehy 02 (RSV-2)  <b>Flash Tank</b> (Flash Tank Off-Gas is Routed to the Thermal Oxidizer or Used as Fuel Gas) (Each)	Flow Rate <b>60</b> MMscfd  <b>8,760</b> hr/yr	GRI-GLYCalc 4.0	VOC	35.84	156.98	43.01	188.38	99%	<b>0.43</b>	<b>1.88</b>
			GRI-GLYCalc 4.0	Benzene	0.05	0.20	0.06	0.25	99%	<b>0.00</b>	<b>0.00</b>
			GRI-GLYCalc 4.0	Ethylbenzene	0.02	0.09	0.02	0.10	99%	<b>0.00</b>	<b>0.00</b>
			GRI-GLYCalc 4.0	n-Hexane	0.81	3.56	0.98	4.27	99%	<b>0.01</b>	<b>0.04</b>
			GRI-GLYCalc 4.0	Toluene	0.14	0.63	0.17	0.76	99%	<b>0.00</b>	<b>0.01</b>
			GRI-GLYCalc 4.0	2,2,4-TMP	0.59	2.61	0.71	3.13	99%	<b>0.01</b>	<b>0.03</b>
			GRI-GLYCalc 4.0	Xylenes	0.13	0.58	0.16	0.70	99%	<b>0.00</b>	<b>0.01</b>
			GRI-GLYCalc 4.0	Tot HAP	1.75	7.67	2.10	9.21	99%	<b>0.02</b>	<b>0.09</b>
			GRI-GLYCalc 4.0	CH4	18	79	22	95	99%	<b>0.22</b>	<b>0.95</b>
			40CFR98 - Table A-1	CO2e	451	1,978	542	2,373	99%	<b>5.42</b>	<b>23.73</b>
<b>RSV-1 RSV-2 (Each)</b>	Dehy 01 (RSV-1) Dehy 02 (RSV-2)  <b>Total Dehydrator Emissions</b> (Each)	Flow Rate <b>60</b> MMscfd  <b>8,760</b> hr/yr	GRI-GLYCalc 4.0	VOC	92.31	404.34	110.78	485.21	99%	<b>1.11</b>	<b>4.85</b>
			GRI-GLYCalc 4.0	Benzene	1.64	7.16	1.96	8.60	99%	<b>0.02</b>	<b>0.09</b>
			GRI-GLYCalc 4.0	Ethylbenzene	1.70	7.45	2.04	8.94	99%	<b>0.02</b>	<b>0.09</b>
			GRI-GLYCalc 4.0	n-Hexane	1.93	8.44	2.31	10.12	99%	<b>0.02</b>	<b>0.10</b>
			GRI-GLYCalc 4.0	Toluene	7.48	32.76	8.98	39.31	99%	<b>0.09</b>	<b>0.39</b>
			GRI-GLYCalc 4.0	2,2,4-TMP	1.42	6.2358	1.71	7.48	99%	<b>0.02</b>	<b>0.07</b>
			GRI-GLYCalc 4.0	Xylenes	15.79	69.15	18.95	82.98	99%	<b>0.19</b>	<b>0.83</b>
			GRI-GLYCalc 4.0	Tot HAP	29.95	131.20	35.94	157.44	99%	<b>0.36</b>	<b>1.57</b>
			GRI-GLYCalc 4.0	CH4	19	83	23	99	99%	<b>0.23</b>	<b>0.9917</b>
			40CFR98 - Table A-1	CO2e	472	2,066	566	2,479	99%	<b>5.66</b>	<b>24.79</b>

- Notes:
- 1 - Used GRI-GLYCalc V4.0 to calculate combined regenerator vent/flash gas emissions.
  - 2 - Total HAP includes n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), and other components.
  - 3 - A 20% contingency has been added to the GRI-GLYCalc results to account for potential future changes in gas quality.

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**Attachment N - Supporting Emissions Calculations**

**Dehydrators 01 and 02 (Summary) - 60 MMscfd**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions		Control Eff %	Controlled Emissions	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
RSV-01 RSV-02 (Each)	Dehydrators 01 and 02  (Sum of Still Vent and Flash Tank Emissions)	---	NOX	---	---	---	---	---	---	---
		---	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	VOC	---	---	110.64	484.62	99.0%	1.11	4.85
		---	SO2	---	---	---	---	---	---	---
		---	PM10/2.5	---	---	---	---	---	---	---
	60.0 MMscfd (Each)	GRI-GLYCalc 4.0	Benzene	---	---	1.97	8.64	99.0%	0.02	0.09
		GRI-GLYCalc 4.0	Ethylbenzene	---	---	2.05	9.00	99.0%	0.02	0.09
	8,760 Hr/yr	---	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	---	---	2.3E+00	10.18	99.0%	0.02	0.10
		GRI-GLYCalc 4.0	Methanol	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Toluene	---	---	9.03	39.55	99.0%	0.09	0.39
		GRI-GLYCalc 4.0	2,2,4-TMP	---	---	1.71	7.48	99.0%	0.02	0.07
		GRI-GLYCalc 4.0	Xylenes	---	---	18.95	82.98	99.0%	0.19	0.83
		GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Total HAP	---	---	36.15	158.33	99.0%	0.36	1.57
		---	CO2	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	CH4	---	---	22.64	99.17	99.0%	0.23	0.99
	21,900 MMscf/yr 2.50 MMscf/hr NESHAP HH - Exempt	---	N2O	---	---	---	---	---	---	---
40CFR98 - Table A-1		CO2e	---	---	566	2,479	99.0%	6	25	

Notes: 1 - To be conservative, and to account for potential future changes in gas quality, the following worst-case emissions were assumed:

60.0 MMscfd Dehydrator 02	GRI-GLYCalc 4.0* Model Results		Worst-Case Assumption		*Dehydrator Operating Parameters (See Attachments L - GRI-GLYCalc Model and H - Extended Gas Analysis)			
	PRE-Control	Controlled	PRE-Control	Controlled				
THC	579.73 tpy	5.80 tpy	695.68 tpy	6.96 tpy	Dry Gas Flow Rate:	60.0 MMscfd	Extended Gas Analysis:	09/23/09 (Caveney)
NMNEHC = VOC	390.03 tpy	3.90 tpy	484.62 tpy	4.85 tpy	Wet Gas Temperature:	70 oF	Flash Tank Temperature:	150 oF
Benzene	7.20 tpy	0.07 tpy	8.64 tpy	0.09 tpy	Wet Gas Pressure:	900 psig	Flash Tank Pressure:	50 psig
Ethylbenzene	7.50 tpy	0.07 tpy	9.00 tpy	0.09 tpy	Wet Gas Water Content:	Saturated	Flash Tank Off-Gas:	99% COMB-1
HCHO	---	---	---	---	Dry Gas Water Content:	7.0 lb H2O/MMscf	Stripping Gas:	na
n-Hexane	8.48 tpy	0.08 tpy	10.18 tpy	0.10 tpy	Lean Glycol Water Content:	1.5 wt% H2O	Stripping Gas Flow Rate:	na
Methanol	---	---	---	---	Glycol Pump Type:	Electric/Pneumatic	Regen Overhead Control:	99% COMB-1
Toluene	32.96 tpy	0.33 tpy	39.55 tpy	0.39 tpy	Glycol Pump Model:	na	Condenser Temperature:	na
2,2,4-TMP	6.24 tpy	0.06 tpy	7.48 tpy	0.07 tpy	Lean Glycol Circulation Rate:	13.70 gpm	Condenser Pressure:	na
Xylenes	69.57 tpy	0.70 tpy	82.98 tpy	0.83 tpy	<b>Additional GRI-GLYCalc 4.0 Model Results:</b>			
Other HAP	---	---	---	---	Flash Tank Off-Gas Flow:	964 scfh	Wet Gas Water Content:	0.053 Vol%
Total HAP	131.94 tpy	1.32 tpy	158.33 tpy	1.57 tpy	Regen Overhead Stream:	1,590 scfh	Dry Gas Water Content:	0.002 Vol%
CH4	82.64 tpy	0.83 tpy	99.17 tpy	0.99 tpy	Lean Glycol Recirc Ratio:	13.5 gal/lb-H2O	Rich Glycol Water Content:	2.230 wt%
CO2e	2,066 tpy	21 tpy	2,479 tpy	25 tpy				

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**Thermal Oxidizer 01 - 6.41 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control	Controlled		
				lb/MMscf	lb/MMBtu	lb/hr	tpy	%	lb/hr	tpy	
<b>COMB-1 (Controls Dehydrator Still Vent and Flash Tank Off-Gas Streams)</b>	<b>Thermal Oxidizer 01 (Combustion Only)</b>  5.78 MMBtu/hr (LHV) <b>6.41 MMBtu/hr (HHV)</b>  <b>8,760 hr/yr</b>  920 Btu/scf (LHV) 1,020 Btu/scf (HHV)  6,286 scf/hr 150.87 Mscfd 55.07 MMscf/yr	EPA AP-42 Table 13.5-1*	NOX	69.36	0.068	na	na	na	<b>0.44</b>	<b>1.91</b>	
		EPA AP-42 Table 13.5-2*	CO	316.20	0.31	na	na	na	<b>1.99</b>	<b>8.71</b>	
		GRI-GLYCalc	VOC	See Dehy-01 and Dehy-02							
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	na	na	na	<b>3.8E-03</b>	<b>0.02</b>	
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	na	na	na	<b>0.05</b>	<b>0.21</b>	
		GRI-GLYCalc	Benzene	See Dehy-01 and Dehy-02							
		GRI-GLYCalc	Ethylbenzene	See Dehy-01 and Dehy-02							
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	na	na	na	<b>4.7E-04</b>	<b>2.1E-03</b>	
		GRI-GLYCalc	n-Hexane	See Dehy-01 and Dehy-02							
		EPA AP-42 Table 1.4-3	Methanol	---	---	na	na	na	---	---	
		GRI-GLYCalc	Toluene	See Dehy-01 and Dehy-02							
		GRI-GLYCalc	2,2,4-TMP	See Dehy-01 and Dehy-02							
		GRI-GLYCalc	Xylenes	See Dehy-01 and Dehy-02							
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	na	na	na	<b>1.2E-05</b>	<b>5.2E-05</b>	
		Sum	Total HAP	0.08	7.54E-05	na	na	na	<b>4.8E-04</b>	<b>2.1E-03</b>	
		EPA AP-42 Table 1.4-2	CO2	120,000	118	na	na	na	<b>754</b>	<b>3,304</b>	
		GRI-GLYCalc	CH4	See Dehy-01 and Dehy-02							
EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	na	na	na	<b>1.4E-02</b>	<b>0.06</b>			
40CFR98 - Table A-1	CO2e	120,656	118	na	na	na	<b>758</b>	<b>3,322</b>			

- Notes: \* AP-42 Flare Emission Factors Revised by EPA in April 2015.
- The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - Max Heat Input calculated as follows:

**Flash Tank Offgas (GRI-GLYCalc):**

1,926 scf/hr Total Flash Tank Off-Gas  
 1,269 Btu/scf (LHV)

**SubTotal: 2.44 MMBtu/hr**

**Regenerator/Still Vents (GRI-GLYCalc):**

3,200 scf/hr Total Flash Tank Off-Gas  
 664 Btu/scf (LHV)

**SubTotal: 2.12 MMBtu/hr**

**Pilot Gas:**

500 scf/hr - Vendor  
 920 Btu/scf (LHV)

**SubTotal: 0.46 MMBtu/hr**

**Total Heat Input:**

Flash Tank Offgas: 2.44 MMBtu/hr  
 Regenerator/Still Vents: 2.12 MMBtu/hr  
 Pilot Gas: 0.46 MMBtu/hr  
 15% Contingency: 0.75 MMBtu/hr

**TOTAL: 5.78 MMBtu/hr (LHV)**

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**Heater Treater 01 - 1.55 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
HTR-01/11E	<b>Heater Treater 01</b>  1.40 MMBtu/hr (LHV) <b>1.55 MMBtu/hr (HHV)</b>  <b>8,760 hr/yr</b>  920 Btu/scf (LHV) 1,020 Btu/scf (HHV)  1,522 scf/hr 36.52 Mscfd 13.33 MMscf/yr	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.15	0.67	na	0.15	0.67
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.13	0.56	na	0.13	0.56
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	0.01	0.04	na	0.01	0.04
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	9.1E-04	4.0E-03	na	9.1E-04	4.0E-03
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	1.2E-02	0.05	na	0.01	0.05
		EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	3.2E-06	1.4E-05	na	3.2E-06	1.4E-05
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	1.1E-04	5.0E-04	na	1.1E-04	5.0E-04
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	2.7E-03	0.01	na	2.7E-03	0.01
		EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Toluene	0.00	3.33E-06	5.2E-06	2.3E-05	---	5.2E-06	2.3E-05
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	na	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	2.9E-06	1.3E-05	na	2.9E-06	1.3E-05
		EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	2.9E-03	0.01	na	2.9E-03	0.01
		EPA AP-42 Table 1.4-2	CO2	120,000	118	183	800	na	183	800
		EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	3.5E-03	0.02	na	3.5E-03	0.02
EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	3.3E-03	0.01	na	3.3E-03	0.01		
40CFR98 - Table A-1	CO2e	120,713	118	184	805	na	184	805		

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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**Condensate Stabilizer Heater 01 - 2.55 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
HTR-02/12E	<b>Condensate Stabilizer Heater 01</b>	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.25	1.10	na	0.25	1.10
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.21	0.92	na	0.21	0.92
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	0.01	0.06	na	0.01	0.06
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	1.5E-03	0.01	na	1.5E-03	0.01
	2.30 MMBtu/hr (LHV)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.02	0.08	na	0.02	0.08
	<b>2.55 MMBtu/hr (HHV)</b>	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	5.3E-06	2.3E-05	na	5.3E-06	2.3E-05
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	1.9E-04	8.2E-04	na	1.9E-04	8.2E-04
	<b>8,760 hr/yr</b>	EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	4.5E-03	0.02	na	4.5E-03	0.02
		EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
	920 Btu/scf (LHV)	EPA AP-42 Table 1.4-3	Toluene	0.00	3.33E-06	8.5E-06	3.7E-05	---	8.5E-06	3.7E-05
	1,020 Btu/scf (HHV)	EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	na	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
	2,500 scf/hr	EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	4.7E-06	2.1E-05	na	4.7E-06	2.1E-05
		EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	4.7E-03	0.02	na	4.7E-03	0.02
	60.00 Mscfd	EPA AP-42 Table 1.4-2	CO2	120,000	118	300	1,314	na	300	1,314
	21.90 MMscf/yr	EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	5.8E-03	0.03	na	5.8E-03	0.03
EPA AP-42 Table 1.4-2		N2O	2.20	2.16E-03	5.5E-03	0.02	na	5.5E-03	0.02	
40CFR98 - Table A-1		CO2e	120,713	118	302	1,322	na	302	1,322	

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.



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**Station Recycle Line Heater 01 - 1.66 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
HTR-03/19E	<b>Station Recycle Line Heater 01</b>	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.16	0.71	na	0.16	0.71
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.14	0.60	na	0.14	0.60
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	0.01	0.04	na	0.01	0.04
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	9.8E-04	4.3E-03	na	9.8E-04	4.3E-03
	1.50 MMBtu/hr (LHV)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	1.2E-02	0.05	na	0.01	0.05
	<b>1.66 MMBtu/hr (HHV)</b>	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	3.4E-06	1.5E-05	na	3.4E-06	1.5E-05
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	1.2E-04	5.4E-04	na	1.2E-04	5.4E-04
	<b>8,760 hr/yr</b>	EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	2.9E-03	0.01	na	2.9E-03	0.01
		EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
	920 Btu/scf (LHV)	EPA AP-42 Table 1.4-3	Toluene	0.00	3.33E-06	5.5E-06	2.4E-05	---	5.5E-06	2.4E-05
	1,020 Btu/scf (HHV)	EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	na	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
	1,630 scf/hr	EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	3.1E-06	1.4E-05	na	3.1E-06	1.4E-05
	39.13 Mscfd	EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	3.1E-03	0.01	na	3.1E-03	0.01
	14.28 MMscf/yr	EPA AP-42 Table 1.4-2	CO2	120,000	118	196	857	na	196	857
		EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	3.8E-03	0.02	na	3.8E-03	0.02
EPA AP-42 Table 1.4-2		N2O	2.20	2.16E-03	3.6E-03	0.02	na	3.6E-03	0.02	
	40CFR98 - Table A-1	CO2e	120,713	118	197	862	na	197	862	

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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**Condensate Stabilizer Heater 02 - 9.70 MMBtu/hr**

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
HTR-04/20E	<b>Condensate Stabilizer Heater 02</b>  8.75 MMBtu/hr (LHV) <b>9.70 MMBtu/hr (HHV)</b>  <b>8,760 hr/yr</b>  920 Btu/scf (LHV) 1,020 Btu/scf (HHV)  9,511 scf/hr 228.26 Mscfd 83.32 MMscf/yr	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.95	4.17	na	<b>0.95</b>	<b>4.17</b>
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.80	3.50	na	<b>0.80</b>	<b>3.50</b>
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	0.05	0.24	na	<b>0.05</b>	<b>0.24</b>
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	0.01	0.02	na	<b>0.01</b>	<b>0.02</b>
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.07	0.32	na	<b>0.07</b>	<b>0.32</b>
		EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	2.0E-05	8.7E-05	na	<b>2.0E-05</b>	<b>8.7E-05</b>
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	7.1E-04	3.1E-03	na	<b>7.1E-04</b>	<b>3.1E-03</b>
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	0.02	0.07	na	<b>0.02</b>	<b>0.07</b>
		EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.33E-06	3.2E-05	1.4E-04	na	<b>3.2E-05</b>	<b>1.4E-04</b>
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	1.8E-05	7.9E-05	na	<b>1.8E-05</b>	<b>7.9E-05</b>
		EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	0.02	0.08	na	<b>0.02</b>	<b>0.08</b>
		EPA AP-42 Table 1.4-2	CO2	120,000	118	1,141	4,999	na	<b>1,141</b>	<b>4,999</b>
		EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	0.02	0.10	na	<b>0.02</b>	<b>0.10</b>
EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	0.02	0.09	na	<b>0.02</b>	<b>0.09</b>		
40CFR98 - Table A-1	CO2e	120,713	118	1,148	5,029	na	<b>1,148</b>	<b>5,029</b>		

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
  - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
  - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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**Produced Water Storage Tanks - 48 bbl and 210 bbl Capacity**

Unit ID	Material Stored	Capacity		Turnovers per Year	Throughput		EPA-450/3-85-001a VOC Emission Factor (Working and Breathing Losses)	ProMax VOC Emission Factor (Flashing Losses)	VOC		n-Hexane and BTEX (Each) 5.00% of VOC		Total HAP 30.00% of VOC	
		gal	bbl		gal/yr	bbl/yr			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
T01	Produced Water	2,000	48	52	104,000	2,476	0.039 lb/bbl	0.074 lb/bbl	0.03	0.14	1.6E-03	0.01	0.01	0.04
T02	Produced Water	8,820	210	52	458,640	10,920	0.039 lb/bbl	0.074 lb/bbl	0.14	0.62	7.0E-03	0.03	0.04	0.18

**TOTAL VOLUME:**    **10,820**    **258**    **52**    **562,640**    **13,396**

**TOTAL EMISSIONS:**    **0.17**    **0.75**    **8.6E-03**    **0.04**    **0.05**    **0.23**

- Notes:
- 1 - EPA-450/3-85-001a – "Volatile Organic Compound Emissions from Petroleum Refinery Wastewater Systems - Background Information for Proposed Standards" is a reasonable protocol for estimating potential produced water storage tank working and breathing emissions. EPA-450/3-85-001a, page 3-39, gives a VOC emission factor of 420 kg/MMgal wastewater produced in an oil-water separator. (0.420 g/gal \* 0.0022 lb/g \* 42 gal/bbl = 0.039 lb/bbl)
  - 2 - These emission estimates are nearly 4X more conservative than emission factors required by the TCEQ on the Barnett Shale produced water tanks at gas-only sites. (<http://www.tceq.texas.gov/assets/public/implementation/air/ie/pseiforms/producedwaterstoragetank.pdf>):

**Table 1. Produced Water Storage Tank Flash Loss Emissions Factors for Barnett Shale Special Inventory Purposes ONLY**

Pollutant	Average Produced Water Emission Factor (lb/bbl)	
	Gas Production Only Sites	Liquid Hydrocarbon and Gas Production Sites
VOC	0.01	0.0402
Benzene	0.0001	0.000054
Toluene	0.0003	0.000130
Ethylbenzene	0.000006	0.000003
Xylene(s)	0.00006	0.000049
n-Hexane	NA	0.000987

- 3 - Produced water storage tank flashing losses are estimated using the ProMax process simulation software.
- 4 - Benzene is estimated at 5% of VOC emissions and Total HAP is estimated at 30.0% of VOC emissions. These is a very conservative estimate based on an investigation of other water and condensate emission estimating protocols, as exemplified above (e.g., Total HAP = (0.0001+0.0003+0.000006+0.00006)/0.01 = 4.7%).
- 5 - Produced water storage tanks are heated to approximately 60 degrees Fahrenheit to prevent freezing.

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**Produced Water - Truck Load-Out 01**

Unit ID	Description	S sat. fac.	P psia	M lb/lb-mol	T °R	CE %	L <sub>L</sub> lb/Mgal	T-Put Mgal/yr	VOC AP-42 Sect 5.2 tpy	n-Hexane, BTEX, and 2,2,4-TMP (Ea) 5.00% of VOC tpy	Total HAP 30.00% of VOC tpy
TLO-1	Truck Load-Out - Produced Water	1.45	1.5	30.0	510	0.0%	1.59	563	0.45	2.2E-02	0.13

<b>TOTAL TLO:</b>	<b>0.45</b>	<b>2.2E-02</b>	<b>0.13</b>
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Notes: 1 - Emission factors and formulas are from AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids":

$$L_L = 12.46 \times S \times P \times M / T \times (1 - CE)$$

where:

L<sub>L</sub> = loading loss, lb/1000 gal of liquid loaded

S = saturation factor, use 1.45 for splash loading

P = true vapor pressure of liquid loaded, psia.  
 (Conservative estimate - Measured RVP (100 °F) ranges from 1.0 to 1.3 psia;  
 so the actual TVP is expected to be less than 0.7 psia at common storage temperature.)

M = molecular weight of vapors, lb/lb-mol (Conservative estimate.)

T = temperature of bulk liquid loaded, °R = °F + 460 (Conservatively assumed 50 °F.)

CE = overall emission reduction efficiency (collection efficiency x control efficiency)

2 - Molecular weight and vapor pressure are based on operator experience and sampling data at various locations in the Marcellus Shale basin.

3 - The total storage tank capacity at the facility is:

258	bbl =	10,820	gal.
52	t-o/yr =	13,396	bbl/yr

4 - It is estimated that each tank will be emptied up to:

5 - n-Hexane, each BTEX, and 2,2,4-TMP components are estimated at 5% of VOC emissions and Total HAP is estimated at 30% of VOC emissions. □

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**Condensate - Truck Load-Out 02**

Unit ID	Description	S	P	M	T	CE	L <sub>L</sub>	T-Put	VOC	n-Hexane, BTEX, and 2,2,4-TMP (Ea)	Total HAP
		sat. fac.	psia	lb/lb-mol	°R	%	lb/Mgal	Mgal/yr	AP-42 Sect 5.2 tpy	1.41% of VOC tpy	8.49% of VOC tpy
TLO-1	Truck Load-Out - Condensate	1.45	10.0	55.7	510	0.0%	19.72	250	2.47	0.03	0.21
<b>TOTAL TLO:</b>									<b>2.47</b>	<b>0.03</b>	<b>0.21</b>

Notes: 1 - Emission factors and formulas are from AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids":

$$L_L = 12.46 \times S \times P \times MW / T \times (1 - CE)$$

- where:
- L<sub>L</sub> = Loading loss, lb/1000 gal of liquid loaded.
  - S = Saturation factor, use 1.45 for "splash loading".
  - P = True vapor pressure of liquid loaded, psia. Maximum of 10 psia.
  - MW = molecular weight of vapors, lb/lb-mol (taken from EPA Tanks 4.0 program).
  - T = Temperature of bulk liquid loaded, °R = °F + 460. (Conservatively assumed 60 °F.)
  - CE = Overall emission reduction efficiency (collection efficiency x control efficiency).

2 - The stabilized condensate product will be pumped down a pipeline for transport off-site. In the event of a pipeline stoppage, the stabilized condensate will be loaded into tanker trucks for transport off-site.

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**Piping and Equipment Fugitives - Gas & Light Oil (Condensate)**

Unit ID	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	Hydrocarbons (THC)		VOC 30.47 Wgt%		n-Hex,BTEX,TMP 0.18 Wgt%		Total HAP 1.06 Wgt%		CO2 0.44 Wgt%		CH4 100.00 Wgt%		CO2e GWP = 25	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
FUG-G (1F)	Process Piping Fugitives (Gas)	Valves	505	0.00992	5.01	21.94	1.53	6.69	8.8E-03	0.04	0.05	0.23	0.02	0.10	5.01	21.94	125.27	548.69
		Pump Seals	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Other	98	0.01940	1.90	8.33	0.58	2.54	3.4E-03	1.5E-02	2.0E-02	0.09	8.4E-03	0.04	1.90	8.33	47.54	208.23
		Connectors	505	0.00044	0.22	0.98	0.07	0.30	3.9E-04	1.7E-03	2.4E-03	0.01	9.8E-04	0.00	0.22	0.98	5.57	24.39
		Flanges	840	0.00086	0.72	3.16	0.22	0.96	1.3E-03	5.6E-03	7.6E-03	3.3E-02	3.2E-03	1.4E-02	0.72	3.16	18.06	79.10
		Open-ended	5	0.00441	0.02	0.10	0.01	0.03	3.9E-05	1.7E-04	2.3E-04	1.0E-03	9.7E-05	4.3E-04	0.02	0.10	0.55	2.41
			<b>1,953</b>		<b>7.88</b>	<b>34.51</b>	<b>2.40</b>	<b>10.52</b>	<b>1.4E-02</b>	<b>6.1E-02</b>	<b>0.08</b>	<b>0.36</b>	<b>0.03</b>	<b>0.15</b>	<b>7.88</b>	<b>34.51</b>	<b>196.99</b>	<b>862.82</b>

Unit ID	Description	Component (Unit) Type (Light Oil)	Unit Count	THC Factor lb/hr/Unit	Hydrocarbons (THC)		VOC 100.00 Wgt%		n-Hex,BTEX,TMP 1.41 Wgt%		Total HAP 8.49 Wgt%		CO2 0.01 Wgt%		CH4 0.40 Wgt%		CO2e GWP = 25	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
FUG-L (2F)	Process Piping Fugitives (Light Oil)	Valves	753	0.00551	4.15	18.18	4.15	18.18	0.06	0.26	0.35	1.54	4.4E-04	1.9E-03	0.02	0.07	0.42	1.84
		Pump Seals	15	0.02866	0.43	1.88	0.43	1.88	6.1E-03	0.03	0.04	0.16	4.6E-05	2.0E-04	0.00	0.01	0.04	0.19
		Other	98	0.01653	1.62	7.10	1.62	7.10	0.02	0.10	0.14	0.60	1.7E-04	7.5E-04	0.01	0.03	0.16	0.72
		Connectors	505	0.00046	0.23	1.02	0.23	1.02	0.00	0.01	0.02	0.09	2.5E-05	1.1E-04	0.00	0.00	0.02	0.10
		Flanges	1,092	0.00024	0.26	1.16	0.26	1.16	3.7E-03	1.6E-02	0.02	0.10	2.8E-05	1.2E-04	0.00	0.00	0.03	0.12
		Open-ended	5	0.00309	0.02	0.07	0.02	0.07	2.2E-04	0.00	0.00	0.01	1.6E-06	7.2E-06	0.00	0.00	0.00	0.01
			<b>2,468</b>		<b>6.71</b>	<b>29.41</b>	<b>6.71</b>	<b>29.41</b>	<b>0.10</b>	<b>0.42</b>	<b>0.57</b>	<b>2.50</b>	<b>7.1E-04</b>	<b>3.1E-03</b>	<b>0.03</b>	<b>0.12</b>	<b>0.68</b>	<b>2.98</b>

<b>TOTAL FUGITIVE EMISSIONS:</b>	<b>14.59</b>	<b>63.92</b>	<b>9.12</b>	<b>39.93</b>	<b>0.11</b>	<b>0.48</b>	<b>0.65</b>	<b>2.86</b>	<b>0.04</b>	<b>0.16</b>	<b>7.91</b>	<b>34.63</b>	<b>198</b>	<b>866</b>
----------------------------------	--------------	--------------	-------------	--------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	--------------	------------	------------

Notes: 1 - Assumed 8,760 hours per year of fugitive emissions.  
 2 - Gas and Light Oil emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

3 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.  
 4 - To be conservative, the following gas characteristics were assumed:

TABLE 2.4 O&G PROD (AVE)	Gas		Light Oil	
	kg/hr	lb/hr	kg/hr	lb/hr
Valves	4.50E-03	0.00992	2.50E-03	0.00551
Pump Seals	na	na	1.30E-02	0.02866
Others	8.80E-03	0.01940	7.50E-03	0.01653
Connectors	2.00E-04	0.00044	2.10E-04	0.00046
Flanges	3.90E-04	0.00086	1.10E-04	0.00024
Open-Ended Lines	2.00E-03	0.00441	1.40E-03	0.00309

Pollutant	Gas		Light Oil (Condensate)	
	Analysis	Estimated	Analysis	Estimated
Carbon Dioxide	0.37 Wgt%	0.44 Wgt%	0.01 Wgt%	0.01 Wgt%
Methane	50.91 Wgt%	100.00 Wgt%	0.34 Wgt%	0.40 Wgt%
VOC	25.39 Wgt%	30.47 Wgt%	97.09 Wgt%	100.00 Wgt%
n-Hex, BTEX, TMP-ea	0.15 Wgt%	0.18 Wgt%	1.18 Wgt%	1.41 Wgt%
Total HAP	0.88 Wgt%	1.06 Wgt%	7.07 Wgt%	8.49 Wgt%

Potentially Applicable  
**AP-42 and GHG EMISSION FACTORS**  
 (Preferentially use test data or vendor data where available)

Pollutant		GAS-FIRED ENGINE			GAS-FIRED TURBINE		
		AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			AP-42 Table 3.1-1; 3.1-2a; 3.1-3 04/00		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix# lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	3.17E+00	4.08E+00	2.21E+00	3.20E-01	1.30E-01	9.90E-02
	CO (≥ 90% Load)	3.86E-01	3.17E-01	3.72E+00	8.20E-02	3.00E-02	1.50E-02
	THC (TOC)	1.64E+00	1.47E+00	3.58E-01	1.10E-02	1.10E-02	1.10E-02
	NMHC (THC-CH4)	1.90E-01	2.20E-01	1.28E-01	2.40E-03	2.40E-03	2.40E-03
	NMNEHC (NMHC-C2H6)	1.19E-01	1.15E-01	5.76E-02	2.10E-03	2.10E-03	2.10E-03
	VOC	1.20E-01	1.18E-01	2.96E-02	2.10E-03	2.10E-03	2.10E-03
	SO2*** (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	3.40E-03	3.40E-03	3.40E-03
	PM10/2.5 (Filter+Cond)	4.83E-02	9.99E-03	1.94E-02	6.60E-03	6.60E-03	6.60E-03
HAPs	Benzene	1.94E-03	4.40E-04	1.58E-03	1.20E-05	1.20E-05	9.10E-07
	Ethylbenzene	1.08E-04	3.97E-05	2.48E-05	3.20E-05	3.20E-05	3.20E-05
	Formaldehyde (HCHO)	5.52E-02	5.28E-02	2.05E-02	7.10E-04	7.10E-04	2.00E-05
	n-Hexane	4.45E-04	1.11E-03	---	---	---	---
	Methanol (MeOH)	2.48E-03	2.50E-03	3.06E-03	---	---	---
	Toluene	9.63E-04	4.08E-04	5.58E-04	1.30E-04	1.30E-04	1.30E-04
	TMP, 2,2,4- (i-Octane)	8.46E-04	2.50E-04	---	---	---	---
	Xylenes	2.68E-04	1.84E-04	1.95E-04	6.40E-05	6.40E-05	6.40E-05
	Other HAPs	1.72E-02	1.44E-02	6.36E-03	1.06E-04	1.06E-04	1.06E-04
GHG	CO2**** (GWP=1)	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
	CH4 (GWP=25)	1.45E+00	1.25E+00	2.30E-01	8.60E-03	8.60E-03	8.60E-03
	N2O (GWP=298)	2.20E-04	2.20E-04	2.20E-04	3.00E-03	3.00E-03	3.00E-03
	CO2e	1.53E+02	1.48E+02	1.23E+02	1.18E+02	1.18E+02	1.18E+02

(#Lean Pre-Mix - aka: Dry Low Emissions (DLE or DLN) and SoLoNOx)

Pollutant		GAS-FIRED EXTERNAL COMBUSTION			FLARE	DIESEL ENGINE
		AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			13.5-1 04/15	3.3-1; 3.3-2 10/96
		Uncontrolled lb/MMBtu	LoNOx Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	Combustion lb/MMBtu	Uncontrolled lb/MMBtu
CRITERIA	NOX	9.80E-02	4.90E-02	3.14E-02	6.80E-02	4.41E+00
	CO	8.24E-02	8.24E-02	8.24E-02	3.10E-01	9.50E-01
	THC (TOC)	1.08E-02	1.08E-02	1.08E-02	≥98%	3.60E-01
	NMHC (THC-CH4)	8.53E-03	8.53E-03	8.53E-03	Destruction and Removal Efficiency	3.53E-01
	NMNEHC (NMHC-C2H6)	5.49E-03	5.49E-03	5.49E-03		3.50E-01
	VOC (NMNEHC+HCHO)	5.56E-03	5.56E-03	5.56E-03	5.88E-04	3.60E-01
	SO2 (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	7.451E-03	2.90E-01
	PM10/2.5 (Filter+Condense)	7.45E-03	7.45E-03	7.45E-03		3.10E-01
HAPs	Benzene	2.06E-06	2.06E-06	2.06E-06	≥98% Destruction and Removal Efficiency	9.33E-04
	Ethylbenzene	---	---	---		---
	HCHO (Formaldehyde)	7.35E-05	7.35E-05	7.35E-05		1.18E-03
	n-Hexane	1.76E-03	1.76E-03	1.76E-03		---
	Methanol (MeOH)	---	---	---		---
	Toluene	3.33E-06	3.33E-06	3.33E-06		4.09E-04
	2,2,4-TMP (i-Octane)	---	---	---		---
	Xylenes	---	---	---		2.85E-04
Other HAPs	1.86E-06	1.86E-06	1.86E-06	1.05E-03		
GHG	CO2 (GWP=1)	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.64E+02
	CH4 (GWP=25)	2.25E-03	2.25E-03	2.25E-03	98% DRE	6.61E-03
	N2O (GWP=298)	2.16E-03	6.27E-04	6.27E-04	2.16E-03	1.32E-03
	CO2e	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.65E+02

40 CFR 98 - DEFAULT EMISSION FACTORS				
Fuel Type	Table C-1 to Subpart C of Part 98		Table C-2 to Subpart C of Part 98	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	163.05	6.61E-03	1.32E-03
Propane	0.091 MMBtu/gal	138.60	6.61E-03	1.32E-03
Natural Gas	1,026 Btu/scf	116.98	2.20E-03	2.20E-04

**Conversion Factors**

<http://www.onlineconversion.com/>

- 1.0 lb = 453.592 g
- 1.0 kg = 2.205 lb
- 1.0 hp = 2,544.433 Btu/hr
- 1.0 hp = 745.700 Watt
- 1.0 kW = 3,412.142 Btu/hr
- 1.0 kW-hr = 1,340 hp-hr
- 1.0 cf = 7.481 gal
- 1.0 gal H2O = 8.338 lb
- 1.0 cf H2O = 62.371 gal
- 1.0 m = 3.281 ft
- 1.0 km = 0.621 mi
- 1.0 acre = 43,560.174 ft2
- 1.0 °F = (°C\*9/5)+32
- 1.0 °R = °F+459.67
- 1.0 % = 10,000 ppm
- UGC (stp) = 379.48 scf/lb-mol

Global Warming Potential (100 Yr) (GWP)		
Table A-1 to Subpart A of Part 98		
CO2	CH4*	N2O#
1.00	25.00	298.00

#Revised by EPA on 11/29/13

\*Converted Ext Comb Emission Factors to lb/MMBtu by dividing lb/MMscf by AP-42 default HHV of 1,020 Btu/scf.

\*\*Converted GHG Emission Factors to lb/MMBtu by multiplying kg/MMBtu by 2.2046 lb/kg.

\*\*\*Assumes 100% conversion of fuel sulfur to SOX (2,000 gr/MMscf).

\*\*\*\*Assumes 99.5% conversion of fuel carbon to CO2 for natural gas.

**ATTACHMENT O**  
**Monitoring/Recordkeeping/Reporting/Testing Plans**  
**(NOT APPLICABLE)**

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“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.”

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

No changes to the current Monitoring/Recordkeeping/Reporting/Testing requirements are proposed.

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**ATTACHMENT O**  
**Monitoring/Recordkeeping/Reporting/Testing Plans**

**Williams Ohio Valley Midstream LLC**  
**CONNER COMPRESSOR STATION**  
**Application for 45CSR13 NSR Modification Permit**

Williams Ohio Valley Midstream LLC proposes the following monitoring, recordkeeping, reporting and testing requirements.

Monitoring

1. Monitor and record quantity of natural gas combusted in each heater and engine.
2. Monitor and record quantity of natural gas treated in the dehydrators.
3. Monitor and record quantity of produced water/stabilized condensate transferred from the storage tanks.
4. Monitor all applicable requirements of 40CFR60 Subparts JJJJ and OOOO.

Recordkeeping

1. Maintain records of the amount of natural gas consumed and hours of operation for each heater and engine.
2. Maintain records of the amount of natural gas treated in the dehydrators.
3. Maintain records of the amount of produced water/stabilized condensate transferred from the storage tanks.
4. Maintain records of testing conducted in accordance with the permit. Said records will be maintained on-site or in a readily accessible off-site location.
5. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the heaters, compressor engines, dehydration units and ancillary equipment.
6. Maintain records of all applicable requirements of 40CFR60 Subparts JJJJ and OOOO.
7. The records shall be maintained on site or in a readily available off-site location for a period of five (5) years.

Testing

Perform an initial compliance test on each Caterpillar G3516B and Caterpillar G3306B TA compressor engine as per requirements of 40CFR60 Subpart JJJJ. Subsequent emissions testing to be performed in accordance with 40CFR 60 Subpart JJJJ as applicable.

## **ATTACHMENT P**

### **Public Notice**

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“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.”

The applicant shall cause such legal advertisement to appear a minimum of one (1) day in the newspaper most commonly read in the area where the facility exists or will be constructed. The notice must be published no earlier than five (5) working days of receipt by this office of your application. The original affidavit of publication must be received by this office no later than the last day of the public comment period.

Types and amounts of pollutants discharged must include all regulated pollutants (PM, PM10, VOC, SO2, Xylene, etc.) and their potential to emit or the permit level being sought in units of tons per year (including fugitive emissions).

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- Legal Advertisement (as shown) will be placed in a newspaper of general circulation in the area where the source is located (See 45CSR§13-8.3 thru 45CSR§13-8.5).
  - An Affidavit of Publication shall be submitted immediately upon receipt.
-

Williams Ohio Valley Midstream LLC (OVM)  
**CONNER COMPRESSOR STATION**  
Application for 45CSR13 NSR Modification Permit

**Attachment P - Public Notice**

**AIR QUALITY PUBLIC NOTICE**  
**Notice of Application**

Notice is given that Williams Ohio Valley Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a 45CSR13 NSR Modification Permit for an existing natural gas compressor station located on the south side of Kull Lane Airport Access Rd., approximately 0.2 miles east of Roberts Ridge Rd (CR-21), approximately 2.3 miles south-southwest of Moundsville, Marshall County, WV.

The latitude and longitude coordinates are 39.8808° North and -80.7468° West.

The applicant estimates the increase/(decrease) in the potential to discharge regulated air pollutants will be as follows:

3.29	tons of nitrogen oxides per year
9.86	tons of carbon monoxide per year
27.96	tons of volatile organic compounds per year
0.02	tons of sulfur dioxide per year
0.39	tons of particulate matter per year
(1.41)	tons of total hazardous air pollutants per year
6,789	tons of carbon dioxide equivalent per year

Startup of modifications are anticipated within one (1) month of authorization.

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality (DAQ), 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

By: Williams Ohio Valley Midstream LLC  
Don Wicburg  
Vice President and General Manager  
100 Teletech Drive, Suite 2  
Moundsville, WV 26041

**ATTACHMENT Q**  
**Business Confidential Claims**  
**(NOT APPLICABLE)**

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also

**ATTACHMENT R**  
**Authority Forms**  
**(NOT APPLICABLE)**

---

also

**ATTACHMENT S**  
**Title V Permit Revision Information**  
**(NOT APPLICABLE)**

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## APPLICATION FEE

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Include a check payable to WVDEP – Division of Air Quality.

- As per WV Rule 22 (45CSR22) filed on May 6, 1991, a **minimum fee of \$1,000** must be submitted for each 45CSR13 permit application filed with the WVDEP-DAQ.
  - **Additional charges** may apply, depending on the nature of the application as outlined in Section 3.4.b. of Regulation 22, and shown below:
    - **NSPS Requirements:**           **\$1,500**    **(Subpart OOOO)**
    - **NESHAP Requirements:**       **\$2,500**    Not Applicable
  - Total application fee is **\$2,500** [= \$1,000 minimum fee + \$1,500 additional charges]
-

**\*\*\*\*\* End of Application for 45CSR13 NSR Modification Permit \*\*\*\***



WILLIAMS FIELD SERVICES GROUP, INC  
 PO BOX 21218  
 TULSA, OK 74121-1218

COMPANY NUMBER: 4000

CHECK NUMBER: 4000110274

PAY DATE	SUPPLIER NO.	SUPPLIER NAME	CHECK TOTAL
04-JUN-15	526257	WV DEP - DIVISION OF AIR QUALITY	2,500.00

Invoice Date	Invoice Or Credit Memo / Invoice Description	Gross	Discount	Net
02-JUN-15	02-JUN-2015 / AIR PERMIT APPLICATION FEE FOR CORN	2,500.00	0.00	2,500.00
<b>Supplier Support 1-866-778-2665</b>		<b>Page Totals</b>	0.00	2,500.00

VERIFY THE AUTHENTICITY OF THIS MULTI-TONE SECURITY DOCUMENT.

CHECK BACKGROUND AREA CHANGES COLOR GRADUALLY FROM TOP TO BOTTOM.



WILLIAMS FIELD SERVICES GROUP, INC  
 PO BOX 21218  
 TULSA, OK 74121-1218  
 Company Number: 4000

JPMorgan Chase Bank, N.A. 70-2322/719  
 Chicago, IL

Check Number: 4000110274

Check Date: 04-JUN-15

Two Thousand Five Hundred Dollars And Zero Cents

Pay To The Order Of:  
 WV DEP - DIVISION OF AIR QUALITY  
 601 57TH ST SE  
 CHARLESTON, WV 25304 United States

PAY (USD) \$2,500.00

*Doula R Chappel*

Authorized Signature

⑈4000 110 274⑈ ⑆07 19 23 2 26⑆

00940 116 7⑈

From: (412) 787-4197  
Danell Zawaski  
WILLIAMS  
2000 Commerce Drive  
Park Place 2  
Pittsburgh, PA 15275

Origin ID: OILA



Ship Date: 12JUN15  
ActWgt: 1.0 LB  
CAD: 104269583/NET3610

Delivery Address Bar Code



SHIP TO: (334) 926-6459 X 1268

BILL SENDER

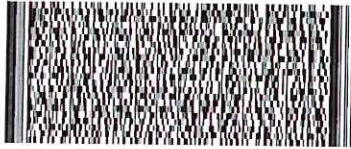
**Beverly McKeone**  
WV Div of Air Quality - Permitting  
601 57th Street, SE

Charleston, WV 25304

Ref # 60000006200000034.6228.8325  
Invoice #  
PO #  
Dept #

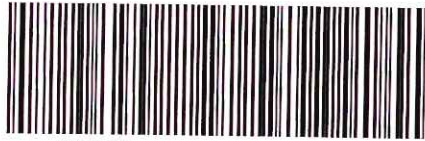
TUE - 16 JUN AA  
\*\* 2DAY \*\*

TRK# 7738 2391 5428  
0201



**SH CRWA**

25304  
WV-US  
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**After printing this label:**

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2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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