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

July 23, 2015
(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 25304-2345

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

Dear Ms. McKeone,

Williams Ohio Valley Midstream LLC (OVM) is submitting an Application for 45CSR13 New Source Review (NSR) Permit for the existing, but permit exempt, Neehouse Compressor Station, located approximately 0.4 Miles North-Northeast of 236 Wolf Run Rd, Cameron, Marshall County, West Virginia.

This application for 45CSR13 NSR Permit has been prepared and submitted as the following changes are proposed to site resulting in emissions above permitting thresholds:

- Install one (1) new 210 bbl produced water tank (with gas blanket)
- Increase the Dehydration Unit glycol circulation rate from 0.67 gpm to 1.5 gpm

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.

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

NEEHOUSE 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

July 2015

APPLICATION FOR
45CSR13 NEW SOURCE REVIEW
MODIFICATION PERMIT

Williams Ohio Valley Midstream LLC

NEEHOUSE COMPRESSOR STATION

Marshall County, West Virginia

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APPLICATION FOR
45CSR13 NEW SOURCE REVIEW
MODIFICATION PERMIT

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WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT
AND
TITLE V PERMIT REVISION
(OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☒ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION** ☒ **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):*
WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM)

2. Federal Employer ID No. ***(FEIN):***
27 – 0856707

3. Name of facility *(if different from above):*
NEEHOUSE COMPRESSOR STATION

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

5A. Applicant's mailing address:
PARK PLACE CORPORATE CENTER 2
2000 COMMERCE DRIVE
PITTSBURGH, PA 15275

5B. Facility's present physical address:
~0.4 MILES NORTHEAST OF 236 WOLF RUN RD
CAMERON, WV 26033

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**
– If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
– If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: **THE WILLIAMS COMPANIES, INC.**

8. Does the applicant own, lease, have an option to buy, or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
– If **YES,** please explain: **APPLICANT LEASES THE PROPERTY**
– If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
1389 - OIL AND GAS FIELD SERVICES, N.E.C.

10. North American Industry Classification System **(NAICS)** code for the facility:
213112 - SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS

11A. DAQ Plant ID No. (existing facilities):
NA

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities):
EXISTING, EXEMPT FACILITY

12A. Directions to the facility:
– For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
– For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.
FROM JEFFERSON AVE IN MOUNDSVILLE:
A. HEAD EAST ON 1ST ST ~ 0.8 MI; B. TURN LEFT ONTO US-250/WAYNESBURG PIKE ~10.3 MI; C. TURN LEFT ONTO IRISH RIDGE RD/CR-50 ~1.0 MI; D. TURN LEFT TO CONTINUE ON IRISH RIDGE RD ~0.5 MI; E. TURN RIGHT ONTO CROSS ROADS/WOLF RUN RD ~0.6 MI; F. TAKE SHARP LEFT ONTO GRAVEL ACCESS ROAD ~0.5 MI; G. ENTRANCE TO SITE IS STRAIGHT AHEAD.

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): **~ 0.4 MI N-NE of 236 Wolf Run Rd**	12C. Nearest city or town: **CAMERON**	12D. County: **MARSHALL**
12.E. UTM Northing (KM): **4,418.82 km Northing**	12F. UTM Easting (KM): **536.42 km Easting**	12G. UTM Zone: **17S**
13. Briefly describe the proposed change(s) at the facility: **THIS APPLICATION IS PREPARED AND SUBMITTED TO:** • **INSTALL ONE (1) NEW 210 BBL PRODUCED WATER TANK** • **INCREASE THE DEHYDRATION UNIT GLYCOL CIRCULATION RATE FROM 0.67 GPM TO 1.5 GPM**		
14A. Provide the date of anticipated installation or change: **~1 MONTH AFTER PERMIT** – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: **NA**		14B. Date of anticipated Start-Up if a permit is granted: **NA**
14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).		
15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application: Hours Per Day: **24** Days Per Week: **7** Weeks Per Year: **52**		
16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**		
17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U.S. EPA Region III.		
18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in **Attachment S** of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**		

Section II. Additional attachments and supporting documents.

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

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

☒ **Bulk Liquid Transfer (TLO/7e)**
☐ Chemical Processes
☐ Concrete Batch Plant
☐ Grey Iron and Steel Foundry
☐ Haul Road Emissions
☐ Hot Mix Asphalt Plant
☐ Incinerator
☐ Indirect Heat Exchanger
☐ Quarry
☐ Solid Materials Sizing, Handling and Storage Facilities
☒ **Storage Tanks (T-01/6E)**
☒ **General Emission Unit, specify:**

- **NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET (CE-01/1E)**
- **NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET (RSV-01/4E, RBV-01/5E)**
- **FUGITIVE LEAK SOURCES (FUG-G/1F AND FUG-W/2F)**

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

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

☐ Absorption Systems
☐ Adsorption Systems
☐ Afterburner
☐ Baghouse
☐ Condenser
☐ Electrostatic Precipitator
☐ Flare
☐ Mechanical Collector
☐ Wet Collecting System
☒ Other Collectors, specify: **NON-SELECTIVE CATALYTIC REDUCTION (01-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**

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

Submit completed and signed Authority Form as Attachment R.

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

35A. **Certification of Information.** To certify this permit application, a Responsible Official (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: _____ DATE: 7/27/2015
(Please use blue ink) *(Please use blue ink)*

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

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

Map(s)

"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:**
  ~0.4 Miles North-Northeast of 236 Wolf Run Rd
  Cameron, Marshall County, WV 26033

- **Latitude and Longitude:**
  39°55'07.7" North x -80°34'25.8" West
  (39.9188° North x -80.5738° West)

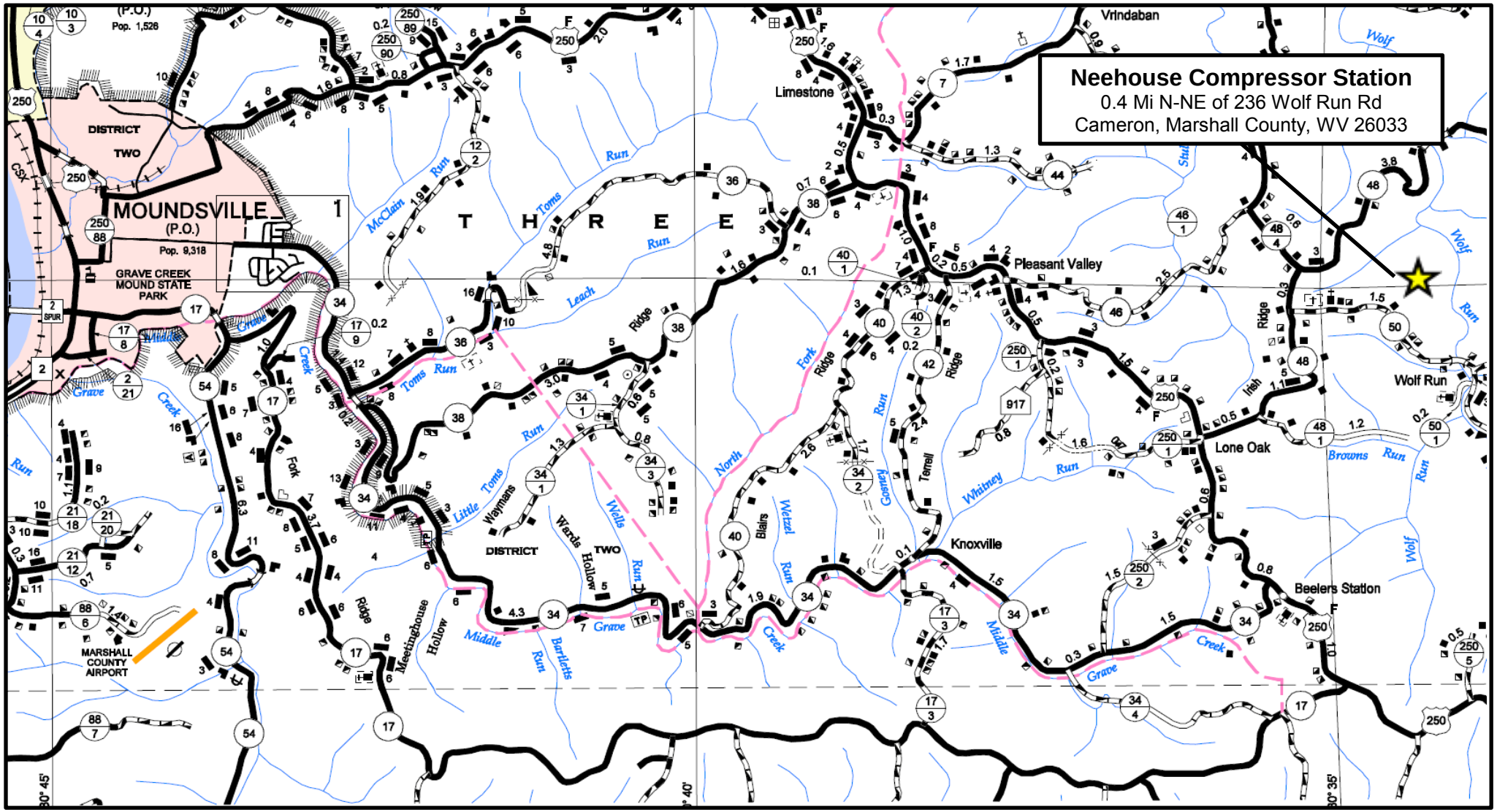
- **UTM:**
  536.42 km Easting x 4,418.83 km Northing x Zone 17S

- **Elevation:**
  ~1,215'

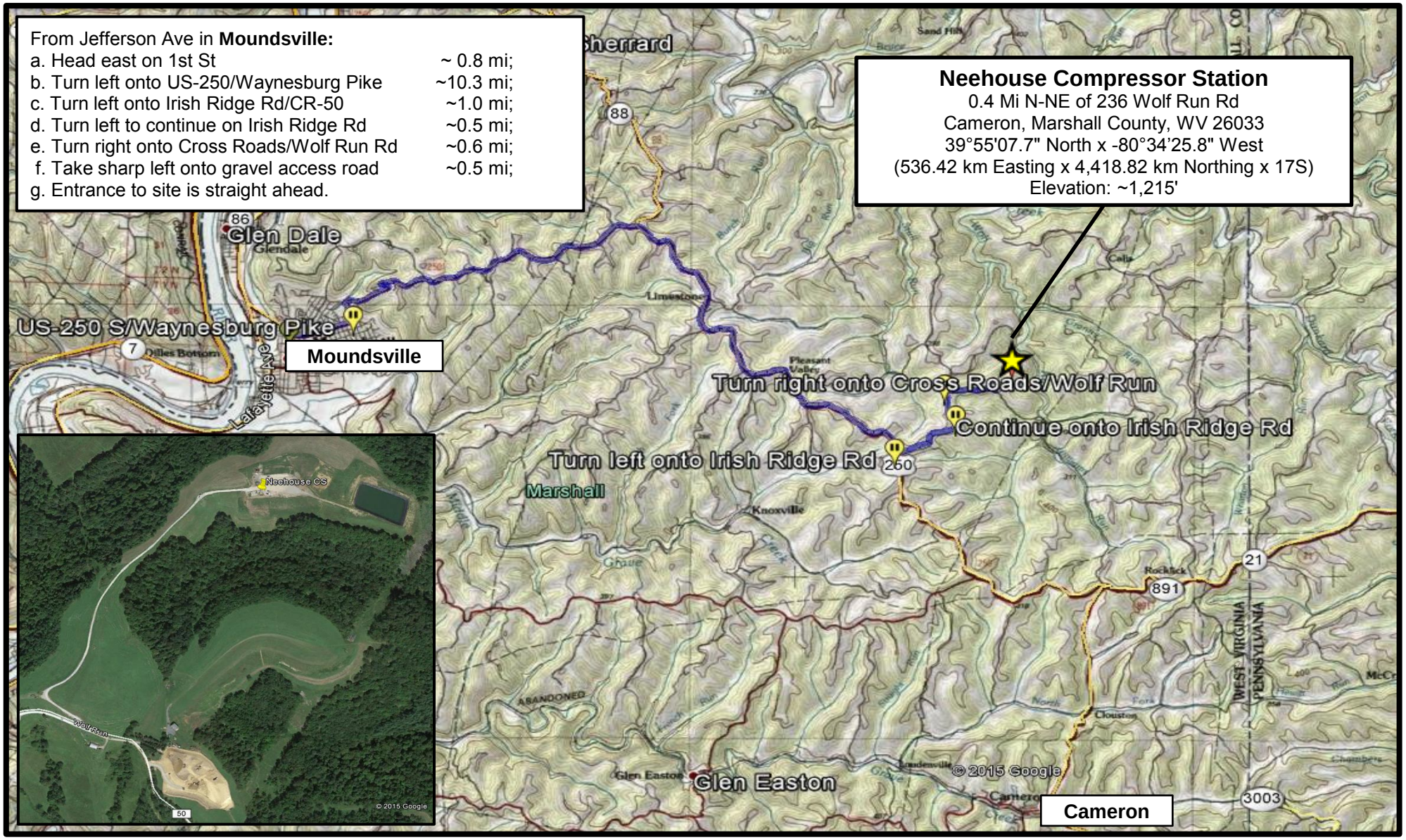
- **Directions:**
  From Jefferson Ave in Moundsville:
  a. Head east on 1st St ~ 0.8 mi;
  b. Turn left onto US-250/Waynesburg Pike ~10.3 mi;
  c. Turn left onto Irish Ridge Rd/CR-50 ~1.0 mi;
  d. Turn left to continue on Irish Ridge Rd ~0.5 mi;
  e. Turn right onto Cross Roads/Wolf Run Rd ~0.6 mi;
  f. Take sharp left onto gravel access road ~0.5 mi;
  g. Entrance to site is straight ahead.

- **USGS:**
  7.5" Topographic – Majorsville WV – 2011

Location Map



Topographic Map



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 Neehouse Compressor Station is an existing, but permit exempt, operation. This application is prepared and submitted as changes are proposed to the site as follows:

- Install one (1) new 210 bbl produced water tank
- Increase Glycol Circulation rate from 0.67 gpm to 1.5 gpm

A. **It is anticipated that the changes will be implemented w/in one month of permit issuance.**

ATTACHMENT D

Regulatory Discussion

"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

NEEHOUSE 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 subject facility has been determined as follows:

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

This rule does not apply. The facility is a "PSD 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 Natural Minor Source with Pre-Controlled PTE < 250 tpy
- SO2: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- PM10/2.5: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy

2. Non-Attainment New Source Review (NNSR) [Not Applicable]

This rule does not apply. The facility location is designated as either "Maintenance" or "Attainment/Unclassified" for all criteria pollutants.

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

4. Title V Operating Permit (TVOP) [Not Applicable]

This rule does not apply. The facility qualifies as a "Title V Minor Source" as follows:

- NOx: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- CO: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- VOC: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- SO2: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- PM10/2.5: Title V Natural Minor Source with Pre-Controlled PTE < 100 tpy
- Each HAP: Title V Natural Minor Source with Pre-Controlled PTE < 10 tpy
- Total HAPs: Title V Natural Minor Source with Pre-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 [Not Applicable]

   This rule does not apply as there are no equipment subject to NSPS regulations.

2. **NSPS Dc, Steam Generating Units**
   40CFR§60.40c-§60.48c [Not Applicable]

   This rule does not apply because there is no steam generating unit at the facility with a maximum design heat input capacity ≥ 10 MMBtu/hr and ≤ 100 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 there is no tank used to store volatile organic liquids (VOL) with a design capacity ≥ 75 m3 (19,815 gal, 471.8 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 a natural gas processing plant (§60.630(b)).

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 [Not Applicable]

This rule does not apply to the 203 bhp Caterpillar G3306TA compressor engine (CE-01/1E) because its maximum engine power is less than 500 HP and manufactured before 07/01/08 (§60.4230(a)(4)(iii)).

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 (§60.4300).

10. NSPS OOOO, Crude Oil and Natural Gas Production
40CFR§60.5360-§60.5430 [Not Applicable]

This rule does not apply to the reciprocating compressor because it commenced construction before 08/23/11 (§60.5360 and §60.5365(c)).

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

This rule does not apply to the storage vessels because they each have a VOC PTE < 6 tpy (§60.5395). However, records of VOC emissions must be retained to demonstrate continuing exemption status (§60.5420(b)(6)(ii) and (§60.5420 (c)(5)(ii)).

11. NESHAP A, General Provisions
40CFR§63.1-§63.16 [Applicable]

This rule does apply to the 5.0 MMscfd TEG Dehydrator (RSV-01/4E) because it is subject to NESHAP Subpart HH. Requirements include notification and recordkeeping.

12. NESHAP HH, Oil and Natural Gas Production Facilities
40CFR§63.760-§63.779 [Applicable]

This rule does apply to the 5.0 MMscfd TEG Dehydrator (RSV-01/4E). However, because the TEG dehydrator has a benzene PTE < 0.9 megagrams per year, it is exempt from all requirements except to maintain records of actual annual average benzene emissions 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 because there is no stationary gas turbine at the facility (§63.6080).

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

40CFR§63.6580-§63.6675 [Applicable]

This rule does apply to the compressor engine (CE-01/1E); however, because it 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. As the engine was manufactured prior to July 1, 2008, there are no applicable requirements under NSPS Subpart JJJJ.

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 because the facility is not a major source of HAP (§63.7485).

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

40CFR§63.11193 – §63.11237 [Not Applicable]

This rule does not apply because gas-fired boilers are not subject to the requirements of this subpart (§63.11195(e)). Specifically, "boiler" is defined 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.

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 (§68.115).

19. Compliance Assurance Monitoring (CAM)

40CFR§64.1-§64.10 [Not Applicable]

This rule does not apply. Although there are pollutant specific emission units subject to an emissions limitation and a control device is used to achieve compliance, the potential pre-control emissions do not exceed 100 tpy.

20. Mandatory Greenhouse Gases (GHG) Reporting

40CFR§98.1-§98.9 [Not Applicable]

This rule does not apply. The facility is not subject to a listed source category and the aggregate maximum heat input capacity is < 30 MMBtu/hr 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 Neehouse Compressor Station is the Zien Compression Station, which is located 1.5 miles away. The Zien Compressor Station does not meet the common sense definition of being "contiguous" with or "adjacent" to the Neehouse Compressor Station.

The Neehouse Compressor Station compresses and dehydrates gas produced from an upstream production well located in northern West Virginia. The subject facility is located on a parcel that is directly adjacent to a pre-existing upstream production wellpad operated by Chevron.

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 Zien Compressor Station, located approximately 1.5 miles away. This facility is the closest to Neehouse to have common ownership but it is not "contiguous" with or "adjacent" to the Neehouse facility.

The production wells, including the Chevron wellpad, 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 wellpad 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 well.

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]

   This rule does apply, however, because the dehydrator reboiler (RBV-01/5E) has a maximum design heat input (MDHI) rating < 10 MMBtu/hr, the only requirement is to limit visible emissions to < 10% opacity during normal operations (§45-02-3.1). The reboiler combusts only natural gas which inherently conforms to the visible emission standards.

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]

   This 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]

   This rule does not apply because there is no refuse combustion performed at the facility.

4. **Prevent and Control Air Pollution from the Emission of Sulfur Oxides**
   45CSR10 [Not Applicable]

   This rule does not apply because each “fuel burning unit” at the facility has a Maximum Design Heat Input (MDHI) rating < 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]

   This rule does apply. Williams OVM is applying for a 45CSR13 New Source Review Modification Permit and has published the required Class I legal advertisement notifying the public of this application to modify the existing permit.

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 air pollutants.

7. **Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60**
   45CSR16 [Not Applicable]

   This rule does not apply because the facility is not subject to any New Source Performance Standard (NSPS).

8. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment

45CSR19 [Not Applicable]

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

9. Requirements for Operating Permits

45CSR30 [Not Applicable]

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

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 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 because the facility is a non-major "deferred" source of all regulated pollutants.

Pursuant to the authority granted in West Virginia 45CSR§30-3.2 and 45CSR§30A-3.1, the DAQ is extending the deferral, which was set to expire December 15, 2000, of non-major sources subject to West Virginia 45CSR30 (Title V Program) from the obligation to submit an operating permit application.

15. Emission Standards for Hazardous Air Pollutants (HAP)

45CSR34 [Not Applicable]

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

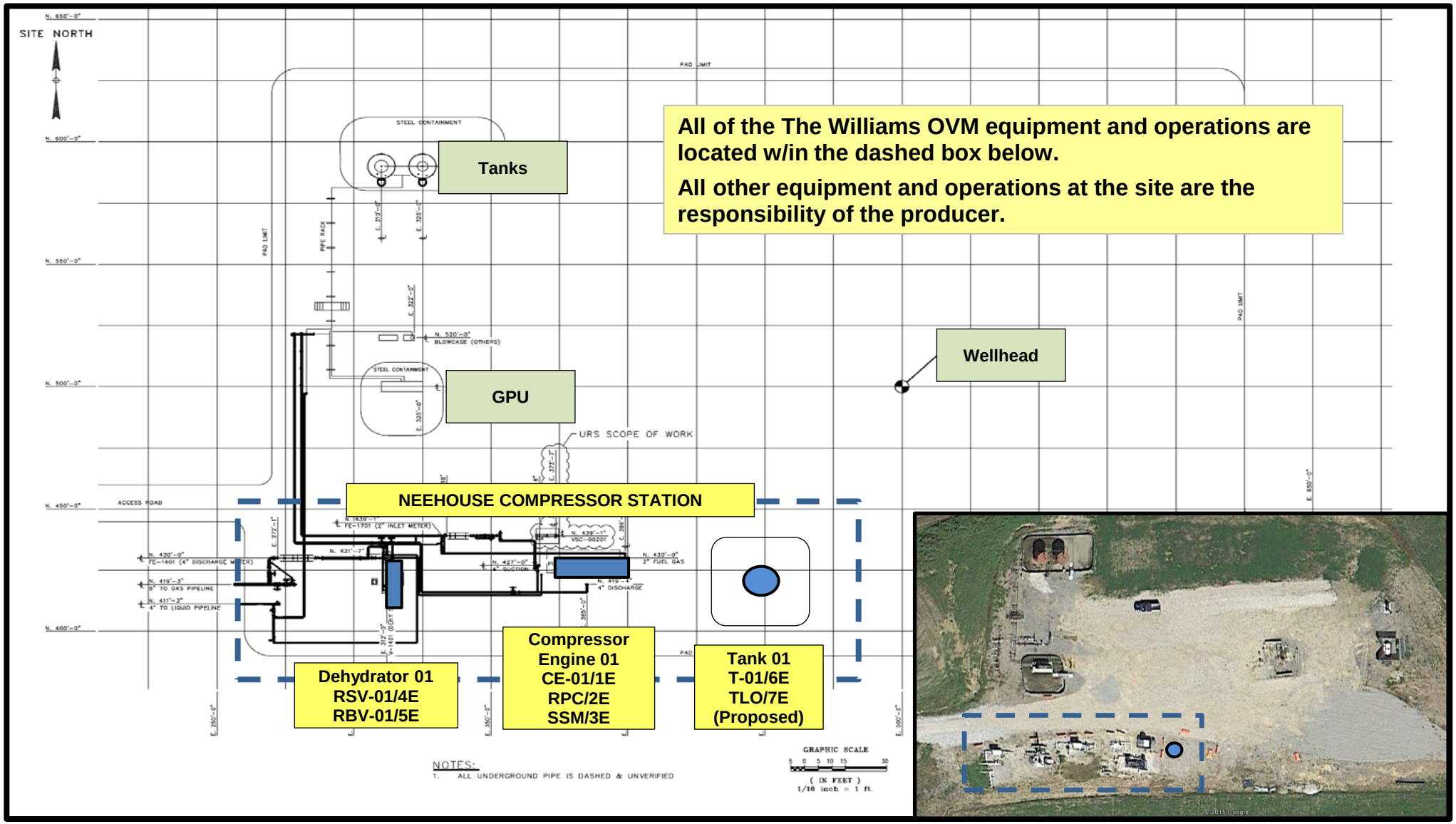
ATTACHMENT E

Plot Plan

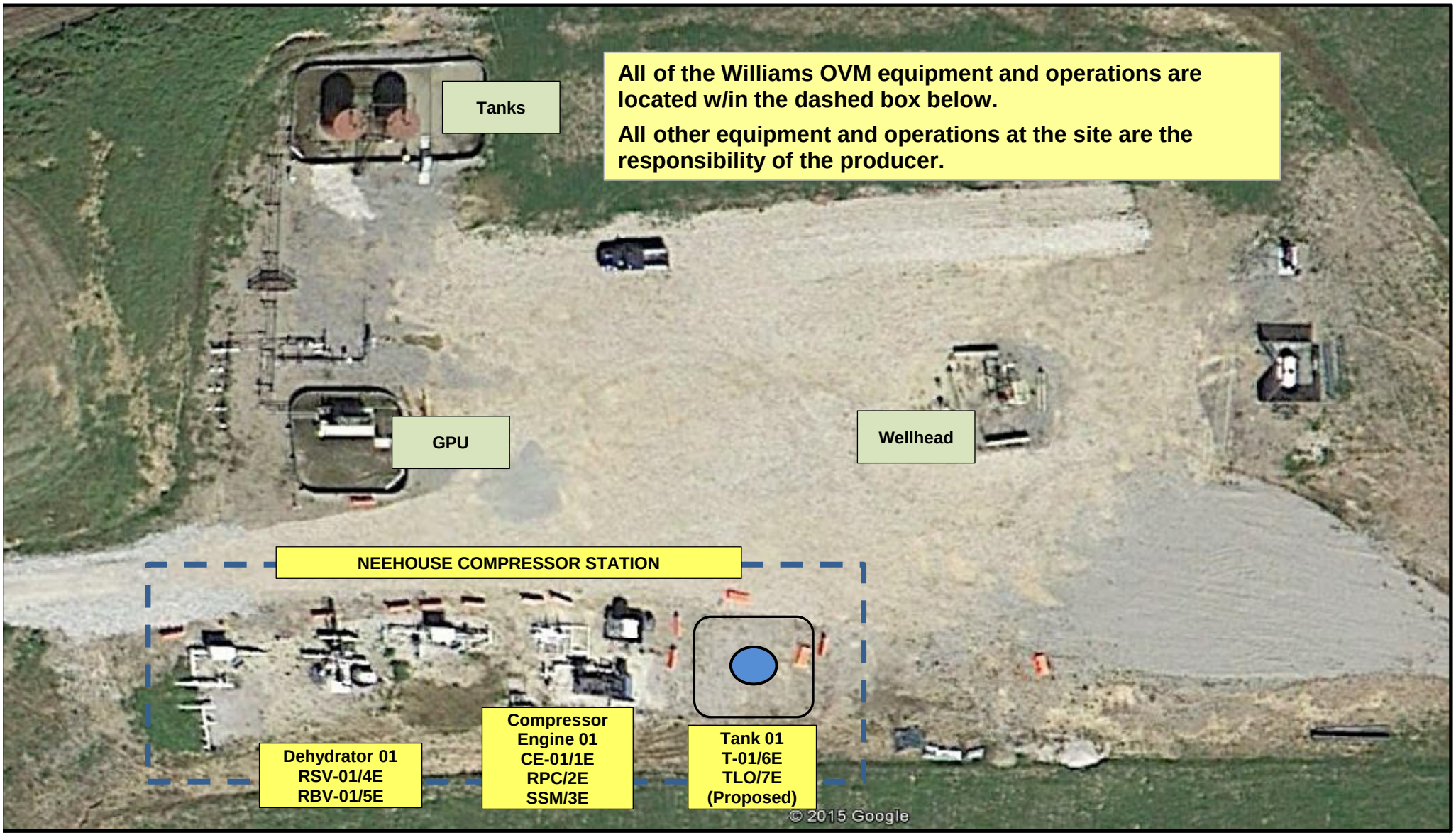
"21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E."

- **Plot Plan**

Plot Plan


SITE NORTH
Tanks
All of the The Williams OVM equipment and operations are located w/in the dashed box below.
All other equipment and operations at the site are the responsibility of the producer.
Wellhead
GPU
URS SCOPE OF WORK
NEEHOUSE COMPRESSOR STATION
Dehydrator 01
RSV-01/4E
RBV-01/5E
Compressor Engine 01
CE-01/1E
RPC/2E
SSM/3E
Tank 01
T-01/6E
TLO/7E
(Proposed)
NOTES:
1. ALL UNDERGROUND PIPE IS DASHED & UNVERIFIED
GRAPHIC SCALE
(IN FEET)
1/16 inch = 1 ft.

Aerial View


All of the Williams OVM equipment and operations are located w/in the dashed box below.
All other equipment and operations at the site are the responsibility of the producer.
Tanks
GPU
Wellhead
NEEHOUSE COMPRESSOR STATION
Dehydrator 01
RSV-01/4E
RBV-01/5E
Compressor Engine 01
CE-01/1E
RPC/2E
SSM/3E
Tank 01
T-01/6E
TLO/7E
(Proposed)
© 2015 Google

ATTACHMENT F

Detailed Process Flow Diagram

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

- **Process Flow Diagram (PFD)**

Williams Ohio Valley Midstream LLC

NEEHOUSE COMPRESSOR STATION

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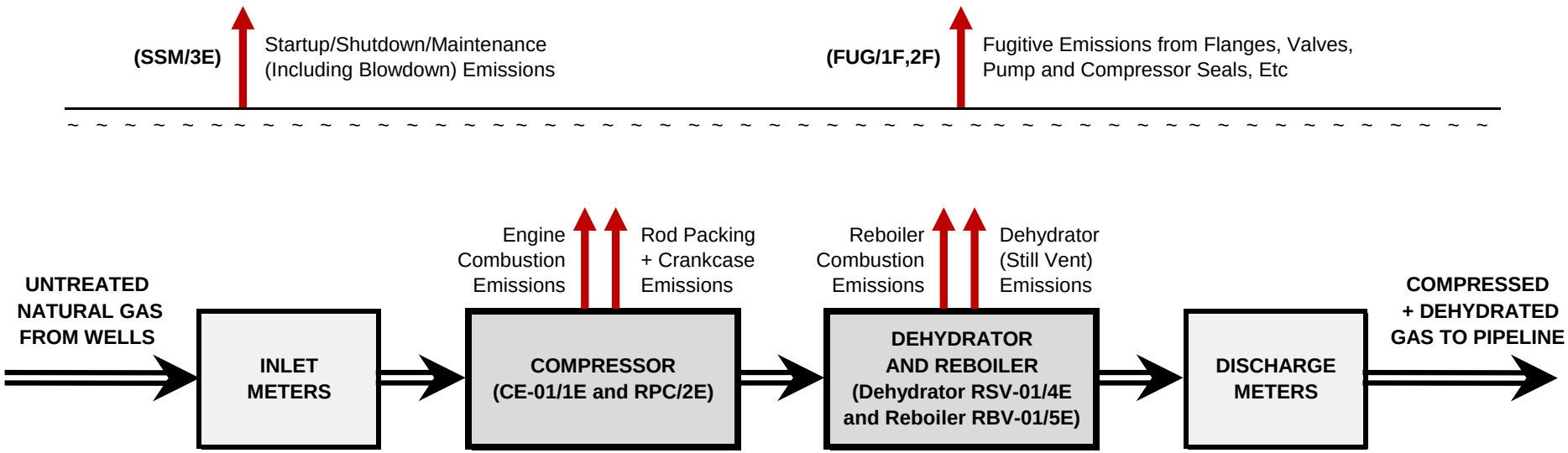
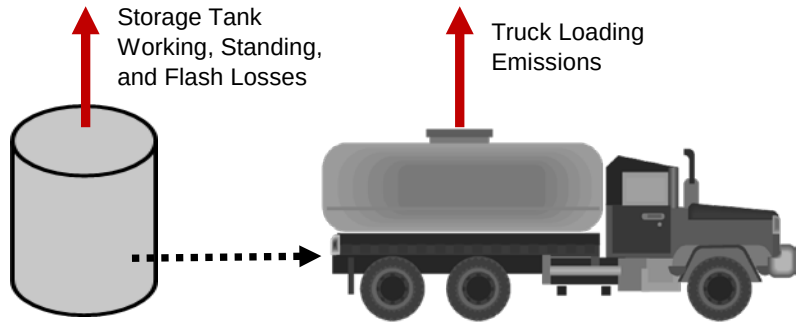
Attachment F - Detailed Process Flow Diagram(s)

Process Flow Diagram (PFD)



ID No.	Description
CE-01 (1E)	203 bhp Caterpillar G3306TA Engine 01
RPC (2E)	Compressor Rod Packing/Crankcase Emissions
SSM (3E)	Startup/Shutdown/Maintenance (w/ Blowdown)
RSV-01 (4E)	5.0 MMscfd Dehydrator 01
RBV-01 (5E)	0.14 MMBtu/hr Reboiler 01
T-01 (6E)	210 bbl Produced Water Tank 01
TLO (7E)	Truck Load-Out
FUG (1F, 2F)	Piping and Process Fugitives



ATTACHMENT G

Process Description

"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 Engine
  - C. Compressor Rod Packing and Crankcase Emissions
  - D. Startup/Shutdown/Maintenance
  - E. Triethylene Glycol (TEG) Dehydrator
  - F. Triethylene Glycol (TEG) Reboiler
  - G. Storage Tanks
  - H. Truck Load-Out
  - I. Piping and Equipment Fugitive Emissions

Williams Ohio Valley Midstream LLC

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 Permit

Attachment G

PROCESS DESCRIPTION

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the existing Neehouse Compressor Station located off Wolf Run Rd approximately 8 miles east of Moundsville in Marshall County (See Appendix B – Site Location Maps). The facility receives natural gas from local production wells then compresses and dehydrates the gas for delivery to a gathering pipeline.

This application is prepared and submitted as changes are proposed to the site as follows:

- Install one new 210 bbl produced water tank (w/ gas blanket)
- Increase Glycol Circulation rate from 0.67 gpm to 1.5 gpm.

B. Compressor Engine

One (1) natural gas-fueled compressor engine is utilized at the facility. The lean-burn engine drives 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 operation results 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.

E. Tri-Ethylene Glycol (TEG) Dehydrator

One (1) Triethylene Glycol (TEG) Dehydrator is utilized at the facility. The dehydrator is comprised of a Contactor/Absorber Tower (no vented emissions) and a Regenerator/Still Vent.

The TEG Dehydrator is 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 sent to the regenerator/still where the TEG is heated to drive off the water vapor and any remaining hydrocarbons. Once boiled, the glycol is returned to a lean state and used again in the process.

F. Tri-Ethylene Glycol (TEG) Reboiler

Tri-Ethylene Glycol (TEG) Reboiler is utilized to supply heat for the Triethylene Glycol (TEG) Regenerator/Still Vent.

G. 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 tank, generate de-minimis (insignificant) emissions.

The produced water tank receives liquids from the dehydrator and inlet separator. Liquids removed through the dehydration process are cooled, condensed and sent to the 210 barrel atmospheric storage tank. The inlet separator removes produced fluids (primarily water) and these liquids are also sent to the 210 bbl atmospheric storage tank.

A ProMax simulation of the Neehouse Compressor Station 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.

Additionally, a gas blanket may be used on the produced water tank to prevent air from entering the tank and potentially causing an explosion.

H. Truck Load-Out

Loading of produced water into tanker trucks will produce small quantities of VOC emissions from the displacement of vapors inside the tanker trucks.

I. 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 water/oil service.

ATTACHMENT H

Material Safety Data Sheets (MSDS)

(And Representative Gas Analysis)

"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."

- **NATURAL GAS**
  - Inlet Gas - Certificate of Analysis
  - Extended Gas Analysis Summary

- **MATERIAL SAFETY DATA SHEETS (MSDS):**
  - Natural Gas
  - Triethylene Glycol (TEG)
  - Produced Water/Condensate

Inlet Natural Gas - Certificate of Analysis

Legacy Measurement Solutions
Shreveport, LA
318-226-7237

Good

Customer	: 2259 - WILLIAMS	**Date Sampled**	: 06/27/2014
Station ID	: 52105-50	**Date Analyzed**	: 07/07/2014
Cylinder ID	: w7037	**Effective Date**	: 07/01/2014
Producer	: 000517-STONE ENERGY INC	**Cyl Pressure**	: 940
Lease	: NEEHOUSE MASTER	**Temp**	: 98
Area	: 500 - OHIO VALLEY MID	**Cylinder Type**	: Spot
State	: WV	**Sample By**	: BT

COMPONENT	MOL%	GPM@14.73(PSIA)
Oxygen	0.0044	0.000
Nitrogen	0.3611	0.000
Methane	82.0816	0.000
Carbon-Dioxide	0.1303	0.000
Ethane	12.6882	3.403
Propane	3.1285	0.864
Iso-Butane	0.4060	0.133
Normal-Butane	0.6440	0.204
Iso-Pentane	0.1808	0.066
Normal-Pentane	0.1363	0.050
2,2-Dimethylbutane	0.0078	0.003
2,3-Dimethylbutane/CycloC5	0.0107	0.004
2-methylpentane	0.0433	0.018
3-methylpentane	0.0267	0.011
Normal-Hexane	0.0455	0.019
2,2-Dimethylpentane	0.0010	0.000
Methylcyclopentane	0.0074	0.003
BENZENE	0.0010	0.000
3,3-Dimethylpentane	0.0000	0.000
CYCLOHEXANE	0.0052	0.002
2-Methylhexane	0.0150	0.007
2,3-Dimethylpentane	0.0041	0.001
3-Methylhexane	0.0150	0.007
1,t2-DMCYC5 / 2,2,4-TMC5	0.0002	0.000
1,t3-Dimethylcyclopentane	0.0003	0.000
N-Heptane	0.0177	0.008
METHYLCYCLOHEXANE	0.0000	0.000
2,5-Dimethylhexane	0.0014	0.001
2,3-Dimethylhexane	0.0021	0.001
TOLUENE	0.0029	0.001
2-Methylheptane	0.0058	0.003
4-Methylheptane	0.0022	0.001
3-Methylheptane	0.0048	0.002
1,t4-Dimethylcyclohexane	0.0019	0.001
N-OCTANE / 1,T2-DMCYC6	0.0070	0.003
1,t3-DMCYC6/1,C4-DMCYC6/1,C2,C3-TMCYC5	0.0001	0.000
2,4,4 TMC6	0.0007	0.000
2,6-Dimethylheptane / 1,C2-DMCYC6	0.0017	0.001
Ethylcyclohexane	0.0000	0.000
O-XYLENE	0.0000	0.000
NONANE	0.0031	0.002
N-DECANE	0.0008	0.000
N-UNDECANE	0.0014	0.001
M-Xylene/P-Xylene	0.0020	0.001
TOTAL	**100.0000**	**4.821**

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment H - Gas Analysis

Extended Gas Analysis Summary

Representative Gas Analysis - Sampled 06/27/14

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	**0.3611**	0.00361	0.1012	0.5163	**266.55**
Oxygen	7782-44-7	O2	32.00	**0.0044**	0.00004	0.0014	0.0072	**3.71**
Hydrogen Sulfide	2148-87-8	H2S	34.09	**---**	---	---	---	**---**
Carbon Dioxide	124-38-9	CO2	44.01	**0.1303**	0.00130	0.0573	0.2927	**151.11**
Methane*	75-82-8	CH4	16.04	**82.0816**	0.82078	13.1674	67.2065	**34,698.37**
Ethane*	74-84-0	C2H6	30.07	**12.6882**	0.12688	3.8151	19.4721	**10,053.38**
Propane**	74-98-6	C3H8	44.10	**3.1285**	0.03128	1.3795	7.0409	**3,635.16**
i-Butane**	75-28-5	C4H10	58.12	**0.4060**	0.00406	0.2360	1.2044	**621.81**
n-Butane**	106-97-8	C4H10	58.12	**0.6440**	0.006440	0.3743	1.9104	**986.33**
Cyclopentane**	287-92-3	C5H10	70.10	**0.0001**	0.000000	0.0000	0.0002	**0.09**
i-Pentane**	78-78-4	C5H12	72.15	**0.1808**	0.001808	0.1304	0.6658	**343.73**
n-Pentane**	109-66-0	C5H12	72.15	**0.1363**	0.001363	0.0983	0.5019	**259.13**
Cyclohexane**	110-82-7	C6H12	84.16	**0.0126**	0.000126	0.0106	0.0541	**27.94**
Other Hexanes**	110-54-3	C6H14	86.18	**0.0885**	0.000885	0.0763	0.3892	**200.96**
Methylcyclohexanes**	varies	C7H14	98.19	**0.0006**	0.000005	0.0005	0.0028	**1.42**
Heptanes**	varies	C7H16	100.20	**0.0569**	0.000569	0.0570	0.2910	**150.24**
C8+ Heavies**	varies	C8+	130.00 est	**0.0324**	0.000323	0.0421	0.2146	**110.82**
Benzene***	71-43-2	C6H6	78.11	**0.0010**	0.000010	0.0008	0.0040	**2.06**
Ethylbenzene***	100-41-4	C8H10	106.17	**0.0001**	0.000000	0.0001	0.0003	**0.14**
n-Hexane***	110-54-3	C6H14	86.18	**0.0455**	0.000455	0.0392	0.2001	**103.32**
Toluene***	108-88-3	C7H8	92.14	**0.0029**	0.000029	0.0027	0.0136	**7.04**
2,2,4-Trimethylpentane**	540-84-1	C8H18	114.23	**0.0002**	0.000002	0.0002	0.0012	**0.60**
Xylenes***	1330-20-7	C8H10	106.17	**0.0020**	0.000020	0.0021	0.0108	**5.60**

Total:	**100.00**	**1.0000**	**19.59**	**100.00**	**51,630**
THC:	**99.51**	**0.9950**	**19.43**	**99.18**	**51,208**
Total CH4:	**82.08**	**0.8208**	**13.17**	**67.21**	**34,698**
Total VOC:	**4.74**	**0.0474**	**2.45**	**12.51**	**6,456**
Total HAP:	**0.05**	**0.0005**	**0.05**	**0.23**	**119**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}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	0.1303	0.2927	151.11	0.172	0.387	200.00
Methane*	75-82-8	CH4	82.0816	67.2065	34,698.37	100.000	100.000	42,275.00
Ethane*	74-98-6	C2H6	12.6882	19.4721	10,053.38	15.271	23.436	12,100.00
VOC**	Various	C3 thru C10+	4.7382	12.5052	6,456.40	5.724	15.108	7,800.00
Benzene***	71-43-2	C6H6	0.0010	0.0040	2.06	0.0024	0.010	5.00
Ethylbenzene***	100-41-4	C8H10	0.0001	0.0003	0.14	0.0018	0.010	5.00
n-Hexane***	110-54-3	C6H14	0.0455	0.2001	103.32	0.0550	0.242	125.00
Toluene***	108-88-3	C7H8	0.0029	0.0136	7.04	0.0041	0.019	10.00
2,2,4-Trimethylpentane**	540-84-1	C8H18	0.0002	0.0012	0.60	0.0017	0.010	5.00
Xylenes***	1330-20-7	C8H10	0.0020	0.0108	5.60	0.0036	0.019	10.00
Total HAP***	Various	C6 thru C8	0.0517	0.2300	118.76	0.0696	0.310	160.00

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

Emergency Telephone Number

Emergency number : 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

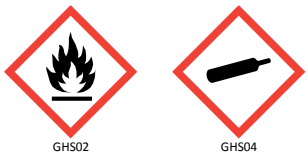
Classification (GHS-US)

Simple Asphy
Flam. Gas 1 H220
Compressed gas H280

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS02 GHS04

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

			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_2S).

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

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_2).Hydrocarbon, sulfur dioxide (SO_2), and Hydrogen sulfide (H_2S) 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 no eat, drink or smoke when using this product

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

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

Hydrogen sulfide (7783-06-4)		
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/m3)	15 mg/m³
USA NIOSH	NIOSH REL (ceiling) (ppm)	10 ppm
USA IDLH	US IDLH (ppm)	100 ppm
Alberta	OEL Ceiling (mg/m³)	21 mg/m³
Alberta	OEL Ceiling (ppm)	15 ppm
Alberta	OEL TWA (mg/m³)	14 mg/m³
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/m³)	21 mg/m³
New Brunswick	OEL STEL (ppm)	15 ppm
New Brunswick	OEL TWA (mg/m³)	14 mg/m³
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/m³)	28 mg/m³
Nunavut	OEL Ceiling (ppm)	20 ppm
Nunavut	OEL STEL (mg/m³)	21 mg/m³
Nunavut	OEL STEL (ppm)	15 ppm
Nunavut	OEL TWA (mg/m³)	14 mg/m³
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL Ceiling (mg/m³)	28 mg/m³
Northwest Territories	OEL Ceiling (ppm)	20 ppm
Northwest Territories	OEL STEL (mg/m³)	21 mg/m³
Northwest Territories	OEL STEL (ppm)	15 ppm
Northwest Territories	OEL TWA (mg/m³)	14 mg/m³
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/m³)	21 mg/m³
Québec	VECD (ppm)	15 ppm

Québec	VEMP (mg/m³)	14 mg/m³
Québec	VEMP (ppm)	10 ppm
Saskatchewan	OEL STEL (ppm)	15 ppm
Saskatchewan	OEL TWA (ppm)	10 ppm
Yukon	OEL STEL (mg/m³)	27 mg/m³
Yukon	OEL STEL (ppm)	15 ppm
Yukon	OEL TWA (mg/m³)	15 mg/m³
Yukon	OEL TWA (ppm)	10 ppm

Propane (74-98-6)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m3)	1800 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1800 mg/m³
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/m³)	1800 mg/m³
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/m3)	1900 mg/m³
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/m³)	1900 mg/m³
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/m³)	2576 mg/m³
Nunavut	OEL STEL (ppm)	1000 ppm
Nunavut	OEL TWA (mg/m³)	1901 mg/m³
Nunavut	OEL TWA (ppm)	800 ppm
Northwest Territories	OEL STEL (mg/m³)	2576 mg/m³
Northwest Territories	OEL STEL (ppm)	1000 ppm
Northwest Territories	OEL TWA (mg/m³)	1901 mg/m³
Northwest Territories	OEL TWA (ppm)	800 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m³)	1900 mg/m³

Québec	VEMP (ppm)	800 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm
Yukon	OEL STEL (mg/m³)	1600 mg/m³
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m³)	1400 mg/m³
Yukon	OEL TWA (ppm)	600 ppm

Carbon dioxide (124-38-9)		
USA ACGIH	ACGIH TWA (ppm)	5000 ppm
USA ACGIH	ACGIH STEL (ppm)	30000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m3)	9000 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	9000 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	5000 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m3)	54000 mg/m³
USA NIOSH	NIOSH REL (STEL) (ppm)	30000 ppm
USA IDLH	US IDLH (ppm)	40000 ppm
Alberta	OEL STEL (mg/m³)	54000 mg/m³
Alberta	OEL STEL (ppm)	30000 ppm
Alberta	OEL TWA (mg/m³)	9000 mg/m³
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/m³)	54000 mg/m³
New Brunswick	OEL STEL (ppm)	30000 ppm
New Brunswick	OEL TWA (mg/m³)	9000 mg/m³
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/m³)	27000 mg/m³
Nunavut	OEL STEL (ppm)	15000 ppm
Nunavut	OEL TWA (mg/m³)	9000 mg/m³
Nunavut	OEL TWA (ppm)	5000 ppm
Northwest Territories	OEL STEL (mg/m³)	27000 mg/m³
Northwest Territories	OEL STEL (ppm)	15000 ppm
Northwest Territories	OEL TWA (mg/m³)	9000 mg/m³
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/m³)	54000 mg/m³
Québec	VECD (ppm)	30000 ppm
Québec	VEMP (mg/m³)	9000 mg/m³
Québec	VEMP (ppm)	5000 ppm
Saskatchewan	OEL STEL (ppm)	30000 ppm

Saskatchewan	OEL TWA (ppm)	5000 ppm
Yukon	OEL STEL (mg/m³)	27000 mg/m³
Yukon	OEL STEL (ppm)	15000 ppm
Yukon	OEL TWA (mg/m³)	9000 mg/m³
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/flame 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

Appearance	:	Clear, Colorless gas
Odor	:	Contains Ethyl Mercaptan for leak detection, which has a skunk-like odor, odorless.
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (butylacetate=1)	:	Not available
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	-157 °C (-250.6°F)
Flash Point	:	-187 °C (-304.6°F)
Auto-ignition Temperature	:	> 288 °C (>550.4°F)
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Extremely flammable gas
Lower Flammable Limit	:	3 %
Upper Flammable Limit	:	17 %
Vapor Pressure	:	40 mm Hg @25°C (77°F)
Relative Vapor Density at 20 °C	:	0.6
Relative Density	:	Not available
Specific Gravity	:	Not available
Solubility	:	Not available
Log Pow	:	Not available
Log Kow	:	Not available
Viscosity, Kinematic	:	Not available
Viscosity, Dynamic	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not available
Explosion Data – Sensitivity to Static Discharge	:	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, CO2).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

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

Hydrogen sulfide (7783-06-4)	
LC50 Inhalation Rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
ATE (gases)	100.000 ppmV/4h

Propane (74-98-6)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Butane (106-97-8)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Ethane (74-84-0)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Wellhead Natural Gas (CAS Mixture)	
LC50 Fish 1	0.002 mg/l (Exposure time: 96 h - Species: Coregonus clupeaformis)

Hydrogen sulfide (7783-06-4)	
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

Wellhead Natural Gas	
Persistence and Degradability	Not established.

Bioaccumulative Potential

Wellhead Natural Gas	
Bioaccumulative Potential	Not established.

Hydrogen sulfide (7783-06-4)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	0.45 (at 25 °C)

Propane (74-98-6)	
Log Pow	2.3

Butane (106-97-8)	
Log Pow	2.89

Carbon dioxide (124-38-9)	
BCF fish 1	(no bioaccumulation)
Log Pow	0.83

Ethane (74-84-0)	
Log Pow	<= 2.8

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

Wellhead Natural Gas	
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Sudden release of pressure hazard

Hydrogen sulfide (7783-06-4)	
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)	
SARA Section 302 Threshold Planning Quantity (TPQ)	500
SARA Section 313 - Emission Reporting	1.0 %

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 (TELs)
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

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 - TCPA - 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

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

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

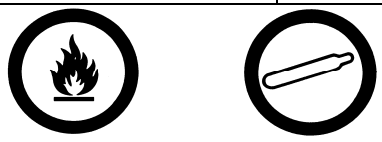
U.S. - Minnesota - Hazardous Substance List
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Excluded Volatile Organic Compounds
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New 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



Hydrogen sulfide (7783-06-4)

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 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

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

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

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

Nitrogen (7727-37-9)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas

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

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

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

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

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: ENCANA CORPORATION
#1800, 855 - 2nd 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

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 (Incl. Species & Route)	Exposure Limits
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.
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.)
Coefficient of Water/Oil Distribution: >100 / 1
Odour & Appearance: colorless/straw coloured liquid, hydrocarbon odour
(N.AV. = not available N.App. = not applicable)

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*
Sensitivity to Impact: No
Sensitivity to Static Discharge: Yes, may ignite*
TDG Flammability Classification: Class 3*
Hazardous Combustion Products: Carbon monoxide, carbon dioxide*

**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.

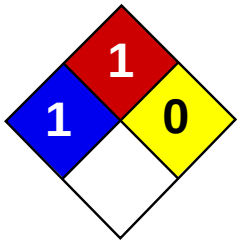
SECTION 8 – FIRST AID MEASURES

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

ScienceLab.com
Chemicals & Laboratory Equipment



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-Ethanediylbis(oxy)]bisethanol

Chemical Formula: C6H14O4

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

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, CO2).

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.

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

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ATTACHMENT I

Emission Units Table

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

- **Emissions Unit Table**

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE 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[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified[(a)]	Design Capacity	Type[3] and Date of Change	Control Device[4]
CE-01	1E	Compressor Engine - Caterpillar G3306TA w/ NSCR	2013	203 bhp	Existing	01-NSCR
RPC	2E	Reciprocating Compressor Rod Packing and Engine Crankcase	2013	203 bhp	Existing	na
SSM	3E	Startup/Shutdown/Maintenance (Blowdown)	2013	203 bhp	Existing	na
RSV-01	4E	TEG Dehydrator - Still Vent	2013	5.0 MMscfd	Modified	na
RBV-01	5E	TEG Dehydrator - Reboiler	2013	0.14 MMBtu/hr	Existing	na
T-01	6E	Storage Tank - Produced Water (With Gas Blanket)	TBD	210 bbl	New	na
TLO	7E	Truck Load-Out - Produced Water	TBD	2,520 bbl/yr	New	na

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

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

[3] New, modification, removal, etc.

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

ATTACHMENT J

Emission Points Data Summary Sheet

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

- **Table 1 – Emissions Data**
- **Table 2 – Release Parameter Data**

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment J - Emission Points Data Summary Sheet

Compressor Engine 01 (CE-01/1E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concen-tration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
		203 bhp CAT G3306TA (4SRB@1,800 rpm) Compressor Engine 01 w/ NSCR						NOX	7.42	32.48	0.89	3.90	Gas	Vendor	
								CO	7.42	32.48	0.89	3.90	Gas	Vendor	
								VOC	0.28	1.22	0.14	0.61	Gas	Vendor	
								SO2	1.1E-03	4.7E-03	1.1E-03	4.7E-03	Gas	AP-42	
								PM10/2.5	0.04	0.15	0.04	0.15	Solid/Gas	AP-42	
								Benzene	2.9E-03	0.01	1.4E-03	6.3E-03	Gas	AP-42	
								Ethylbenzene	4.5E-05	0.00	2.3E-05	9.9E-05	Gas	AP-42	
								HCHO	0.11	0.49	0.06	0.25	Gas	Vendor	
								n-Hexane	---	---	---	---	Gas	AP-42	
								Methanol	0.01	0.02	2.8E-03	0.01	Gas	AP-42	
								Toluene	1.0E-03	0.00	5.1E-04	2.2E-03	Gas	AP-42	
CE-01/1E	Upward Vertical	CE-01/1E	CE-01/1E	01-NSCR	NSCR	C	8,760	2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	3.6E-04	0.00	1.8E-04	7.8E-04	Gas	AP-42	
								Other HAP	0.01	0.05	0.01	0.03	Gas	AP-42	
								Total HAP	0.13	0.58	0.07	0.29	Gas	Sum	
								CO2	256	1,119	256	1,119	Gas	AP-42	
								CH4	0.46	2.00	0.46	2.00	Gas	Vendor	
								N2O	4.0E-04	1.8E-03	4.0E-04	1.8E-03	Gas	Ap-42	
								CO2e	267	1,170	267	1,170	Gas	Wgt Sum	

Continued …

Attachment J - Emission Points Data Summary Sheet

Rod Packing/Crankcase Leaks (RPC/2E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RPC/2E	na	RPC/2E	RPC/2E	na	na	C	8,760	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	0.54	2.37	0.54	2.37	Gas	Vendor	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								Ethylbenzene	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								HCHO	1.4E-03	0.01	1.4E-03	0.01	Gas	Vendor	
								n-Hexane	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								Methanol	---	---	---	---	Gas	---	
								Toluene	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								2,2,4-TMP	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								Xylenes	1.9E-03	0.01	1.9E-03	0.01	Gas	Vendor	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	0.01	0.06	0.01	0.06	Gas	Sum	
								CO2	3	14	3	14	Gas	Vendor	
								CH4	2.92	12.80	2.92	12.80	Gas	Vendor	
								N2O	---	---	---	---	Gas	---	
								CO2e	76	334	76	334	Gas	Wgt Sum	

Rod Packing/Crankcase Leaks (RPC/2E)

Continued …

Attachment J - Emission Points Data Summary Sheet

Start/Stop/Maintenance (w/ Blowdown) (SSM/3E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concen-tration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	---	2.47	---	2.47	Gas	Vendor	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	1.4E-03	---	1.4E-03	Gas	Vendor	
								Ethylbenzene	---	1.4E-03	---	1.4E-03	Gas	Vendor	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	0.03	---	0.03	Gas	Vendor	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	1.4E-03	---	1.4E-03	Gas	Vendor	
SSM/3E	na	SSM/3E	SSM/3E	na	na	I	208	2,2,4-TMP	---	1.4E-03	---	1.4E-03	Gas	Vendor	
								Xylenes	---	1.4E-03	---	1.4E-03	Gas	Vendor	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	0.03	---	0.03	Gas	Sum	
								CO2	---	0.04	---	0.04	Gas	---	
								CH4	---	8.62	---	8.62	Gas	Vendor	
								N2O	---	---	---	---	Gas	---	
								CO2e	---	216	---	216	Gas	Wgt Sum	

Startup, Shutdown and Maintenance (SSM/3E)

Continued …

Attachment J - Emission Points Data Summary Sheet

Dehydrator 01 (Still Vent) (RSV-01/4E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concen-tration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	---	---	---	---	Gas	---	
	5.0 MMscfd Dehydrator 01 (RSV-01/4E) (Still Vent)							CO	---	---	---	---	Gas	---	
								VOC	10.16	44.50	10.16	44.50	Gas	GLYCalc	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	0.12	0.54	0.12	0.54	Gas	GLYCalc	
								Ethylbenzene	0.03	0.11	0.03	0.11	Gas	GLYCalc	
								HCHO	---	---	---	---	Gas	GLYCalc	
								n-Hexane	0.21	0.94	0.21	0.94	Gas	GLYCalc	
								Methanol	---	---	---	---	Gas	---	
RSV-01/4E	Upward Vertical	RSV-01/4E	RSV-01/4E	na	na	C	8,760	Toluene	0.56	2.43	0.56	2.43	Gas	GLYCalc	
								2,2,4-TMP	9.9E-04	4.3E-03	9.9E-04	4.3E-03	Gas	GLYCalc	
								Xylenes	0.65	2.83	0.65	2.83	Gas	GLYCalc	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	1.57	6.86	1.57	6.86	Gas	Sum	
								CO2	0	1	0	1	Gas	---	
								CH4	28.14	123.25	28.14	123.25	Gas	GLYCalc	
								N2O	---	---	---	---	Gas	---	
								CO2e	704	3,083	704	3,083	Gas	Wgt Sum	

Continued …

Attachment J - Emission Points Data Summary Sheet

Dehydrator Reboiler 01 (RBV-01/5E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	0.01	0.06	0.01	0.06	Gas	AP-42	
	0.14 MMBtu/hr Dehydrator Reboiler 01 (RBV-01/5E							CO	0.01	0.05	0.01	0.05	Gas	AP-42	
								VOC	7.8E-04	0.00	7.8E-04	0.00	Gas	AP-42	
								SO2	8.2E-05	3.6E-04	8.2E-05	3.6E-04	Gas	AP-42	
								PM10/2.5	1.0E-03	0.00	1.0E-03	0.00	Solid/Gas	AP-42	
								Benzene	2.9E-07	1.3E-06	2.9E-07	1.3E-06	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	AP-42	
								HCHO	1.0E-05	4.5E-05	1.0E-05	4.5E-05	Gas	AP-42	
								n-Hexane	2.5E-04	1.1E-03	2.5E-04	1.1E-03	Gas	AP-42	
								Methanol	---	---	---	---	Gas	AP-42	
RBV-01/5E	Upward Vertical	RBV-01/5E	RBV-01/5E	na	na	C	8,760	Toluene	4.7E-07	2.0E-06	4.7E-07	2.0E-06	Gas	AP-42	
								2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	---	---	---	---	Gas	AP-42	
								Other HAP	2.6E-07	1.1E-06	2.6E-07	1.1E-06	Gas	AP-42	
								Total HAP	2.6E-04	1.1E-03	2.6E-04	1.1E-03	Gas	Sum	
								CO2	16	72	16	72	Gas	AP-42	
								CH4	3.2E-04	1.4E-03	3.2E-04	1.4E-03	Gas	AP-42	
								N2O	3.0E-04	1.3E-03	3.0E-04	1.3E-03	Gas	AP-42	
								CO2e	17	73	17	73	Gas	Wgt Sum	

Continued …

Attachment J - Emission Points Data Summary Sheet

Produced Water Storage Tank 01 (T-01/6E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
		210 bbl Produced Water Storage Tank (T-01 (6E))						NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	0.02	0.13	0.02	0.13	Gas	EPA	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	5.3E-04	2.4E-03	5.3E-04	2.4E-03	Gas	EPA	
								Ethylbenzene	5.3E-04	2.4E-03	5.3E-04	2.4E-03	Gas	EPA	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	1.8E-03	8.6E-03	1.8E-03	8.6E-03	Gas	EPA	
								Methanol	---	---	---	---	Gas	---	
T-01 (6E)	Upward Vertical	T-01 (6E)	T-01 (6E)	na	na	C	8,760	Toluene	5.3E-04	2.4E-03	5.3E-04	2.4E-03	Gas	EPA	
								2,2,4-TMP	5.3E-04	2.4E-03	5.3E-04	2.4E-03	Gas	EPA	
								Xylenes	5.3E-04	2.4E-03	5.3E-04	2.4E-03	Gas	EPA	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	4.4E-03	0.02	4.4E-03	0.02	Gas	---	
								CO2	1.8E-04	2.1E-03	1.8E-04	2.1E-03	Gas	EPA	
								CH4	5.3E-03	3.0E-01	5.3E-03	3.0E-01	Gas	EPA	
								N2O	---	---	---	---	Gas	---	
								CO2e	0.13	7.56	0.13	7.56	Gas	EPA	

Continued …

Attachment J - Emission Points Data Summary Sheet

Produced Water - Truck Load-Out (TLO/7E)

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
TLO/7E	Upward Vertical	TLO/7E	TLO/7E	na	na	I	na	NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	---	0.08	---	0.08	Gas	AP-42	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								Ethylbenzene	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								2,2,4-TMP	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								Xylenes	---	4.2E-03	---	4.2E-03	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	0.03	---	0.03	Gas	Sum	
								CO2	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
								N2O	---	---	---	---	Gas	---	
								CO2e	---	---	---	---	Gas	---	

Produced Water - Truck Load-Out (TLO-01/7E)

Continued …

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[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concen-tration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	7.43	32.54	0.90	3.96	Gas	Sum	
								CO	7.43	32.53	0.90	3.95	Gas	Sum	
								Point - VOC	11.55	53.19	11.41	52.58	Gas	Sum	
								Fugitive - VOC	2.15	9.42	2.15	9.42	Gas	Sum	
								Total - VOC	13.70	62.60	13.56	62.00	Gas	Sum	
								SO2	1.2E-03	0.01	1.2E-03	0.01	Gas	Sum	
								PM10/2.5	0.04	0.16	0.04	0.16	Gas	Sum	
								Benzene	0.16	0.71	0.16	0.70	Gas	Sum	
								Ethylbenzene	0.05	0.24	0.05	0.24	Solid/Gas	Sum	
								HCHO	0.11	0.50	0.06	0.25	Gas	Sum	
								n-Hexane	0.32	1.45	0.32	1.45	Gas	Sum	
								Methanol	0.01	0.02	2.8E-03	0.01	Gas	Sum	
								Toluene	0.60	2.64	0.60	2.64	Gas	Sum	
na	na	na	na	na	na	na	na	2,2,4-TMP	0.03	0.14	0.03	0.14	Gas	Sum	
								Xylenes	0.67	2.93	0.67	2.93	Gas	Sum	
								Other HAP	0.01	0.05	0.01	0.03	Gas	Sum	
								Total HAP	1.97	8.68	1.90	8.39	Gas	Sum	
								CO2	276	1,207	276	1,207	Gas	Sum	
								CH4	44	192	44	192	Gas	Sum	
								N2O	7.0E-04	3.1E-03	7.0E-04	3.1E-03	Gas	Sum	
								CO2e	2,744	12,018	2,744	12,018	Gas	Sum	

FACILITY-WIDE SUMMARY
(Including Fugtives (FUG-G/1F and FUG-W/2F)

Continued …

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
Formadehyde	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).

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NEEHOUSE COMPRESSOR STATION

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Attachment J - Emission Points Data Summary Sheet

Release Parameter Data

Table 2: Release Parameter Data

Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (oF)	Volumetric Flow[1] (acfm) (A*t operating conditions)*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height[2] *(Release height of emissions above ground level)*	Northing	Easting
CE-01 1E	**0.5**	**1,064**	**970**	**82**	**1,215**	**21.7**	**4,418.8**	**536.4**
RSV-01 4E	**0.6**	**212**	**---**	**---**	**1,215**	**10.0**	**4,418.8**	**536.4**
RBV-01 5E	**0.6**	**120**	**---**	**---**	**1,215**	**10.0**	**4,418.8**	**536.4**

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

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**

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 **--- Truck Load-Out (TLO/7E) is 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.”

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[1]	Maximum Potential Pre-Controlled Emissions[2]		Maximum Potential Controlled Emissions[3]		Est. Method Used[4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Paved Haul Roads	na	---	---	---	---	---
Unpaved Haul Roads	na	---	---	---	---	---
Storage Pile Emissions	na	---	---	---	---	---
Loading/Unloading Operations	**--- Truck Load-Out (TLO/7E) is included in Point Source Emissions ---**					
Wastewater Treatment	na	---	---	---	---	---
Equipment Leaks (FUG-G and FUG-L (17E) (Total)	**VOC**	**2.15**	**9.42**	**2.15**	**9.42**	**AP-42**
	Benzene	**0.03**	**0.12**	**0.03**	**0.12**	**AP-42**
	Ethylbenzene	**0.03**	**0.12**	**0.03**	**0.12**	**AP-42**
	Formaldehyde (HCHO)	**---**	**---**	**---**	**---**	**---**
	n-Hexane	**0.10**	**0.44**	**0.10**	**0.44**	**AP-42**
	Methanol (MeOH)	**---**	**---**	**---**	**---**	**---**
	Toluene	**0.03**	**0.12**	**0.03**	**0.12**	**AP-42**
	2,2,4-TMP (i-Octane)	**0.03**	**0.12**	**0.03**	**0.12**	**AP-42**
	Xylenes	**0.03**	**0.12**	**0.03**	**0.12**	**AP-42**
	Other HAP	**---**	**---**	**---**	**---**	**---**
	Total HAP	**0.24**	**1.03**	**0.24**	**1.03**	**Sum**
	CO2e	**142**	**624**	**142**	**624**	**Wgt Sum**
General Clean-up VOC Emissions	na	---	---	---	---	---
Other	na	---	---	---	---	---

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

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

[3] 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).

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

Williams Ohio Valley Midstream LLC (OVM)

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Application for 45CSR13 NSR Modification Permit

Attachment K - Fugitive Emissions

DESCRIPTION OF FUGITIVE EMISSIONS

Soure Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (Days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	Light Liquid VOC[6,7]				
	Heavy Liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC				
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves[11]	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Open Ended Lines[12]	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Sampling Connections[13]	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				
				TOTAL (lb/yr)	**18,832**
				TOTAL (tpy)	**9.42**

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)

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

- Natural Gas Compressor/Generator Engine Data Sheet
  - Caterpillar G3306TA Compressor Engine – Vendor Data
- Natural Gas Glycol Dehydration Unit Data Sheet
- 40 CFR Part 63; Subpart HH & HHH Registration Form
- Storage Tank Data Sheet
- Model Results - Storage Tank - ProMax
  - Flowchart
  - Workbook
- Storage Tank List (Insignificant Sources)
- Bulk Liquid Transfer Operations

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment L - Emission Unit Data Sheet

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Compressor Station		**Neehouse CS**					
Source Identification Number[1]		**CE-01/1E**					
Engine Manufacturer and Model		**CAT G3306TA**					
Manufacturer's Rated bhp/rpm		**203 / 1,800**					
Source Status[2]		**ES**					
Date Installed/Modified/Removed[3]		**2013**					
Manufactured/Reconstruction Date[4]		**07/20/07**					
Certified Engine (40CFR60 NSPS JJJJ)[5]		**No**					
Engine, Fuel and Combustion Data	Engine Type[6]	**RB4S**					
	APCD Type[7]	**NSCR**					
	Fuel Type[8]	**RG**					
	H_2S (gr/100 scf)	**0.2**					
	Operating bhp/rpm	**203 / 1,800**					
	BSFC (Btu/bhp-hr)	**8,978**					
	Fuel (ft^3/hr)	**1,787**					
	Fuel ($MMft^3$/yr)	**15.65**					
	Operation (hrs/yr)	**8,760**					
Reference[9]	PTE[10]	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	**NOx**	**0.89**	**3.90**				
MD	**CO**	**0.89**	**3.90**				
MD	**VOC**	**0.14**	**0.61**				
AP	**SOx**	**0.00**	**0.00**				
AP	**PM10/2.5**	**0.04**	**0.15**				
AP	**Benzene**	**1.4E-03**	**6.3E-03**				
AP	**Ehtylbenzene**	**2.3E-05**	**9.9E-05**				
MD	**Formaldehyde**	**0.06**	**0.25**				
AP	**n-Hexane**	**---**	**---**				
AP	**Methanol**	**2.8E-03**	**0.01**				
AP	**Toluene**	**5.1E-04**	**2.2E-03**				
AP	**2,2,4-TMP**	**---**	**---**				
AP	**Xyelene**	**1.8E-04**	**7.8E-04**				
AP	**Other HAP**	**0.01**	**0.03**				
Sum	**Total HAP**	**0.07**	**0.29**				
MD	**CO2e**	**256**	**1,119**				
MD	**CH4**	**0.46**	**2.00**				
AP	**N2O**	**4.0E-04**	**1.8E-03**				
Weighted Sum	**CO2e**	**267**	**1,170**				

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.

USA COMPRESSION

USA Compression Unit 1855 Caterpillar G3306TA Engine Emissions

Date of Manufacture	July 20, 2007	Engine Serial Number	G6X03324	Date Modified/Reconstructed	N/A
Driver Rated HP	203	Rated Speed in RPM	1800	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	6	Compression Ratio	10.5:1	Combustion Setting	Rich Burn
Displacement, in^3	640	Fuel Delivery Method	Carburetor	Combustion Air Treatment	T.C/ Aftercooled

Raw Engine Emissions

Fuel Consumption *8098* *LHV BTU/bhp-hr* *or* *8908* *HHV BTU/bhp-hr*
Altitude *1500* *ft*
Maximum Air Inlet Temp *77* *F*

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	TPY
Nitrogen Oxides (NOx)	16.57		7.416	32.480
Carbon Monoxide (CO)	16.57		7.416	32.480
Volatile Organic Compounds (VOC or NMNEHC)	0.37		0.166	0.725
Formaldehyde (CH2O)	0.25		0.112	0.490
Particulate Matter (PM) Filterable+Condensable		1.94E-02	0.035	0.154
Sulfur Dioxide (SO2)		5.88E-04	0.001	0.005

	g/bhp-hr [1]	lb/MMBTU [2]	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	511 or 571	110.0	199	790
Methane (CH4)	1.02	0.23	0.416	1.652

[1] g/bhp-hr are based on Caterpillar Specifications. Note that g/bhp-hr values are based on 100% Load Operation.
It is recommended to add a safety margin to emissions to allow for operational flexibility and fuel gas composition variability.
[2] Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combution Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-3).

Catalytic Converter Emissions

Catalytic Converter Make amd Model: *Miratech, Model RCS-1816-06*
Element Type: *3-Way*
Number of Elements in Housing: *1*
Air/Fuel Ratio Control *Compliance Controls, AFR-9*

	% Reduction	lb/hr	TPY
Nitrogen Oxides (NOx)	88	**0.89**	**3.90**
Carbon Monoxide (CO)	88.0	**0.89**	**3.90**
Volatile Organic Compounds (VOC or NMNEHC)	50	**0.08**	**0.36**
Formaldehyde (CH2O)	50	**0.06**	**0.25**
Particulate Matter (PM)	0	**3.51E-02**	**1.54E-01**
Sulfur Dioxide (SO2)	0	**1.06E-03**	**4.66E-03**

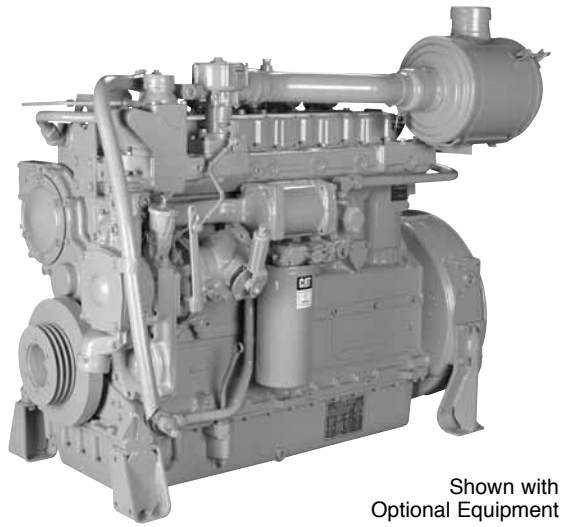
	% Reduction	lb/hr	Metric Tonne/yr
Carbon Dioxide (CO2)	0	**199**	**790**
Methane (CH4)	0	**0.42**	**1.65**

CATERPILLAR®

G3306 Gas Petroleum Engine

108 (NA)/151 (TA) bkW
[145 (NA)/203 (TA) bhp]
1800 rpm

0.5% O_2 Rating



Shown with
Optional Equipment

CAT® ENGINE SPECIFICATIONS

In-Line 6, 4-Stroke-Cycle

Bore	121 mm (4.75 in.)
Stroke	152 mm (6.0 in.)
Displacement	10.5 L (638 cu. in.)
Aspiration	Naturally Aspirated or Turbocharged-Aftercooled
Governor and Protection	Hydra-mechanical
Combustion	Catalyst
Engine Weight, net dry (approx)	948 kg (2090 lb)
Power Density	6.3 kg/kW (10.3 lb/bhp)
Power per Displacement	19.3 bhp/L
Jacket Water Capacity	20 L (5.3 gal)
Lube Oil System (refill)	45.1 L (11.9 gal)
Oil Change Interval	750 hours
Rotation (from flywheel end)	Counterclockwise
Flywheel and Flywheel Housing	SAE No. 1
Flywheel Teeth	156

FEATURES

Engine Design
- Proven reliability and durability
- Ability to burn a wide spectrum of gaseous fuels
- Robust diesel strength design prolongs life and lowers owning and operating costs
- Broad operating speed range

Emissions
- Rich burn engine design easily meets emission requirements
- Meets U.S. EPA Spark Ignited Stationary NSPS emissions for 2007/8 and 2010/11 with the use of aftermarket AFRC and TWC

Full Range of Attachments

Large variety of factory-installed engine attachments reduces packaging time

Testing

Every engine is full-load tested to ensure proper engine performance.

Gas Engine Rating Pro

GERP is a PC-based program designed to provide site performance capabilities for Cat® natural gas engines for the gas compression industry. GERP provides engine data for your site's altitude, ambient temperature, fuel, engine coolant heat rejection, performance data, installation drawings, spec sheets, and pump curves.

Product Support Offered Through Global Cat Dealer Network

More than 2,200 dealer outlets

Cat factory-trained dealer technicians service every aspect of your petroleum engine

Cat parts and labor warranty

Preventive maintenance agreements available for repair-before-failure options

S•O•S℠ program matches your oil and coolant samples against Caterpillar set standards to determine:
- Internal engine component condition
- Presence of unwanted fluids
- Presence of combustion by-products
- Site-specific oil change interval

Over 80 Years of Engine Manufacturing Experience

Over 60 years of natural gas engine production

Ownership of these manufacturing processes enables Caterpillar to produce high quality, dependable products.
- Cast engine blocks, heads, cylinder liners, and flywheel housings
- Machine critical components
- Assemble complete engine

Web Site

For all your petroleum power requirements, visit www.catoilandgas.cat.com.

STANDARD EQUIPMENT

Air Inlet System
Air cleaner — intermediate duty, dry
Air cleaner rain cap (shipped loose)
Service indicator

Control System
Governor — hydra-mechanical (optional on TA)
Throttle control, mechanical
Slide and lock (non-governed units)

Cooling System
Thermostats and housing — full open temperature 97° C (207° F)
Jacket water pump — gear-driven, centrifugal, non-self-priming
Aftercooler water pump — gear-driven, centrifugal, non-self-priming
Aftercooler core, for treated water

Exhaust System
Exhaust manifolds, watercooled
Exhaust elbow — dry, 127 mm (5 in)

Flywheels and Flywheel Housings
Flywheel — SAE No. 1
Flywheel housing — SAE No. 1
SAE standard rotation

Fuel System
Gas pressure regulator
Requires 12-25 psi gas
Natural gas carburetor

Ignition System
Altronic V ignition system

Instrumentation
Instrument panel, LH
Oil pressure
Coolant temperature
Hour meter
Inlet air temperature

Lube System
Crankcase breather — top mounted
Oil cooler
Oil filter
Oil pan — full sump
Oil filler and dipstick

Mounting System
Shutoffs
Low oil pressure
High coolant temperature
High inlet air temperature
Overspeeds — 2
Electronic
Mechanical speed switch

Protection System
See Mandatory Attachments

General
Paint — Cat yellow
Crankshaft vibration damper and drive pulley
Lifting eyes

OPTIONAL EQUIPMENT

Charging System
Battery chargers
Charging alternators
Charging alternators f/u/w agricultural engine
Ammeter gauge
Ammeter gauge and wiring

Control System
PSG Woodward governor
Hydra-mechanical governor f/u/w agricultural engines
Vernier and positive locking control
Carburetor control removal

Cooling System
Air-to-Air aftercooler conversion
Aftercooler group
Expansion tank
Heat exchanger and expansion tank
Radiators
Blower fans
Suction fans
Fan drives
Fan adapters
Belt tightener

Exhaust System
Flexible fittings
Elbows
Flanges
Pipes
Rain caps
Mufflers

Fuel System
Catalyst conversion group
Low pressure gas conversion
Fuel filter

Ignition System
Altronic III
CSA shielded ignition
Wiring harness
Dual timing

Instrumentation
Gauges and instrument panels

Lube System
Lubricating oil

Mounting System
Vibration isolators

Power Take-Offs
Auxiliary drive pulleys
Auxiliary pump
Enclosed clutch
Clutch support
Flywheel stub shaft
Front stub shaft

Protection System
Mechanical shutoff

Starting System
Air pressure regulator
Air silencer
Starting aids
Battery sets — 12-volt, dry
Battery sets — 24-volt, dry
Battery cables
Battery rack
Gas starting motor
Electric starting motor

General
Tool set

TECHNICAL DATA

G3306 Gas Petroleum Engine (0.5% O_2 Rating) — 1800 rpm

		DM5053-07	DM5202-04
Aspiration		Naturally Aspirated	Turbocharged/Aftercooled
Engine Power			
@ 100% Load	bkW (bhp)	108 (145)	151 (203)
@ 75% Load	bkW (bhp)	81 (109)	113 (152)
Engine Speed	rpm	1800	1800
Max Altitude @ Rated Torque and 38°C (100°F)	m (ft)	0	0
Speed Turndown @ Max Altitude, Rated Torque, and 38°C (100°F)	%	44	33
AC Temperature	°C (°F)	N/A	54 (130)
Emissions*			
NOx	g/bkW-hr (g/bhp-hr)	18.08 (13.48)	22.22 (16.57)
CO	g/bkW-hr (g/bhp-hr)	18.05 (13.46)	22.22 (16.57)
NMHC	g/bkW-hr (g/bhp-hr)	130 (0.33)	0.24 (0.18)
Exhaust O_2	% dry	0.5	0.5
CO_2	g/bkW-hr (g/bhp-hr)	651 (485)	685 (571)
VOC**	g/bkW-hr (g/bhp-hr)	0.3 (0.22)	0.16 (0.12) or 0.37
Fuel Consumption***			
@ 100% Load	MJ/bkW-hr (Btu/bhp-hr)	11 (7775)	11.46 (8098)
@ 75% Load	MJ/bkW-hr (Btu/bhp-hr)	11.77 (8318)	11.95 (8444)
Heat Balance			
Heat Rejection to Jacket Water			
@ 100% Load	bkW (Btu/min)	106.27 (6049)	158.9 (9045)
@ 75% Load	bkW (Btu/min)	91.99 (5236)	132.4 (7534)
Heat Rejection from Aftercooler			
@ 100% Load	bkW (Btu/min)	N/A	9.05 (515)
@ 75% Load	bkW (Btu/min)	N/A	3.65 (208)
Heat Rejection to Exhaust			
@ 100% Load (LHV to 77° F / 25° C)	bkW (Btu/mn)	84.98 (4837)	117.62 (6695)
@ 75% Load (LHV to 77°) (LHV to 77° F / 25° C)	bkW (Btu/mn)	66.01 (3757)	90.39 (5145)
Exhaust System			
Exhaust Gas Flow Rate			
@ 100% Load	m^3/min (cfm)	19.2 (678)	27.47 (970)
@ 75% Load	m^3/min (cfm)	15.06 (532)	21.38 (755)
Exhaust Stack Temperature			
@ 100% Load	°C (°F)	593.9 (1101)	573.3 (1064)
@ 75% Load	°C (°F)	575 (1067)	554.4 (1030)
Intake System			
Air Inlet Flow Rate			
@ 100% Load	m^3/min (scfm)	5.89 (208)	8.64 (305)
@ 75% Load	m^3/min (scfm)	4.73 (167)	6.88 (243)
Gas Pressure	kPag (psig)	10.3-69 (1.5-10)	82.7-172.4 (12-24.9)

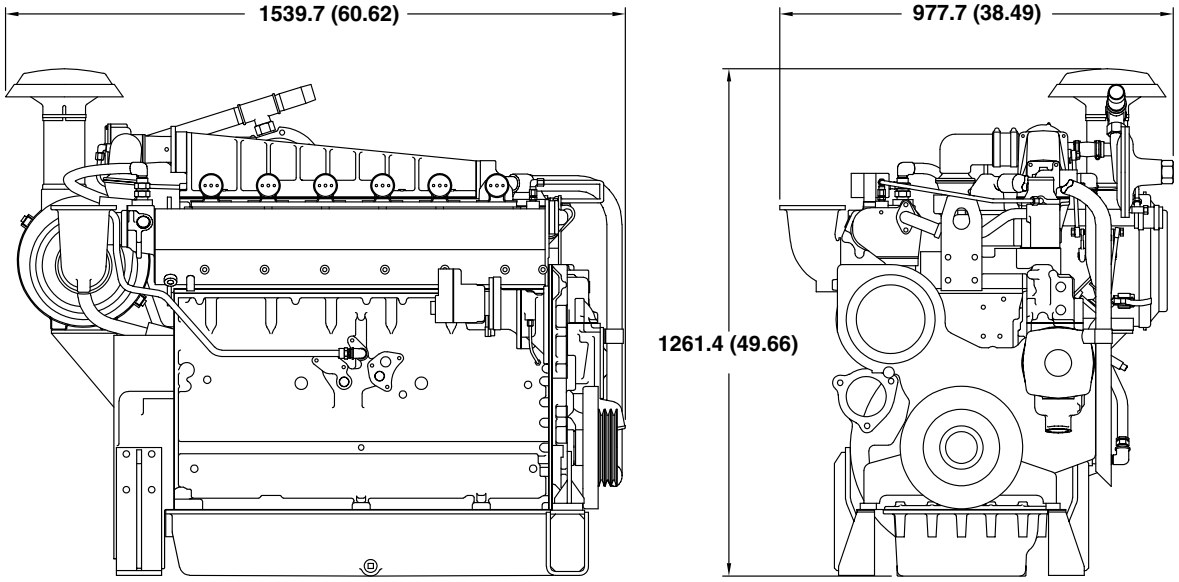
*at 100% load and speed, all values are listed as not to exceed
**Volatile organic compounds as defined in U.S. EPA 40 CFR 60, subpart JJJJ i.e., NMNEHC, Does NOT include HCHO)
***ISO 3046/1

CATERPILLAR®

G3306 GAS PETROLEUM ENGINE

108 (NA)/151 (TA) bkW [145 (NA)/203 (TA) bhp]

GAS PETROLEUM ENGINE



DIMENSIONS		
Length	mm (in)	1505 (59)
Width	mm (in)	1208 (48)
Height	mm (in)	978 (39)
Shipping Weight	kg (lb)	948 (2090)

Note: General configuration not to be used for installation. See general dimension drawing 5N-6097 for detail.

Dimensions are in mm (inches).

RATING DEFINITIONS AND CONDITIONS

Engine performance is obtained in accordance with SAE J1995, ISO3046/1, BS5514/1, and DIN6271/1 standards.

Transient response data is acquired from an engine/generator combination at normal operating temperature and in accordance with ISO3046/1 standard ambient conditions. Also in accordance with SAE J1995, BS5514/1, and DIN6271/1 standard reference conditions.

Conditions: Power for gas engines is based on fuel having an LHV of 83.74 kJ/L (905 Btu/cu ft) at 101 kPa (29.91 in. Hg) and 15° C (59° F). Fuel rate is based on a cubic meter at 100 kPa (29.61 in. Hg) and 15.6° C (60.1° F). Air flow is based on a cubic foot at 100 kPa (29.61 in. Hg) and 25° C (77° F). Exhaust flow is based on a cubic foot at 100 kPa (29.61 in. Hg) and stack temperature.

Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.
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TMI Reference No.: DM5053-07, DM5202-04
LEHW0026-00 (11-09)
Supersedes LEHW7566-01

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Attachment L - Emission Unit Data Sheet

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Compressor Station		Neehouse CS	
		Manufacturer and Model		---	
		Max Dry Gas Flow Rate (MMscf/day)		5.0	
		Design Heat Input (MMBtu/hr) - HHV		0.14	
		Design Type (DEG or TEG)		TEG	
		Source Status[2]		ES	
		Date Installed/Modified/Removed[3]		2013	
		Regenerator Still Vent APCD[4]		NA	
		Fuel HV (Btu/scf) - LHV		920	
		H_2S Content (gr/100 scf)		0.2	
		Operation (hrs/yr)		8,760	
Source ID #[1]	Vent	Reference[5]	PTE[6]	lbs/hr	tons/yr
RSV-01/4E	Dehydrator 01 (Still Vent)	GRI-GLYCalc	VOC	10.71	46.92
		GRI-GLYCalc	Benzene	0.13	0.56
		GRI-GLYCalc	Ethylbenzene	0.03	0.11
		GRI-GLYCalc	n-Hexane	0.22	0.96
		GRI-GLYCalc	Toluene	0.57	2.50
		GRI-GLYCalc	2,2,4-TMP	1.0E-03	4.4E-03
		GRI-GLYCalc	Xylenes	0.64	2.79
		Sum	Total HAP	1.58	6.93
		GRI-GLYCalc	CO2	0.36	1.56
		GRI-GLYCalc	CH4	32.73	143.35
		Weighted Sum	CO2e	819	3,585
RBV-01/5E	Dehydrator 01 (Reboiler Vent)	AP-42	NOX	0.01	0.06
		AP-42	CO	0.01	0.05
		AP-42	VOC	7.8E-04	0.00
		AP-42	SO2	8.2E-05	3.6E-04
		AP-42	PM10/2.5	1.0E-03	0.00
		AP-42	Benzene	2.9E-07	1.3E-06
		AP-42	Ethylbenzene	---	---
		AP-42	HCHO	1.0E-05	4.5E-05
		AP-42	n-Hexane	2.5E-04	1.1E-03
		AP-42	Methanol	---	---
		AP-42	Toluene	4.7E-07	2.0E-06
		AP-42	2,2,4-TMP	---	---
		AP-42	Xylenes	---	---
		AP-42	Other HAP	2.6E-07	1.1E-06
		Sum	Total HAP	2.6E-04	1.1E-03
		AP-42	CO2	16	72
		AP-42	CH4	3.2E-04	1.4E-03
		AP-42	N2O	3.0E-04	1.3E-03
		Weighted Sum	CO2e	17	73

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.**

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment L

40 CFR Part 63; Subpart HH & HHH Registration Form

West Virginia Department of Environmental Protection

Division of Air Quality

40 CFR Part 63; Subpart HH & HHH Registration Form

DIVISION OF AIR QUALITY : (304) 926-0475

WEB PAGE: http:\\www.wvdep.org

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.

Section A: Facility Description		
Affected facility actual annual average natural gas throughput (scf/day):	**5.0 MM**	
Affected facility actual annual average hydrocarbon liquid throughput: (bbl/day):	**na**	
The affected facility processes, upgrades, or stores hydrocarbon liquids prior to custody transfer.	☑ Yes	☐ 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.	☑ Yes	☐ No
The affected facility is: ☑ prior to a NG processing plant ☐ NG processing plant ☐ 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).	☐ Yes	☑ No
The affected facility exclusively processes, stores, or transfers black oil with an initial producing gas-to-oil ratio (GOR): **na** scf/bbl API gravity: **na** degrees	☐ Yes	☑ No

Section B: Dehydration Unit (if applicable)[1]					
Description: **7.0 MMscfd - TEG Dehy 01 (RSV-1 (2E)**					
Date of Installation:	**2013**	Annual Operating Hours:	**8,760**	Burner rating (MMbtu/hr):	**0.14**
Exhaust Stack Height (ft):	**10.0**	Stack Diameter (ft):	**0.6**	Stack Temp. (oF):	**120**
Glycol Type:	☑ TEG ☐ EG	☐ Other: **na**			
Glycol Pump Type:	☐ Elect ☑ Gas	If Gas, what is the volume ratio?: **0.08 acfm/gpm**			
Condenser installed?	☐ Yes ☑ No	Exit Temp: **na**		Condenser Pressure: **na**	
Incinerator/flare installed?	☐ Yes ☑ No	Destruction Eff.: **na**			
Other controls installed?	☐ Yes ☑ No	Describe: **na**			
Wet Gas[2]: (Upstream of Contact Tower)	Gas Temperature: **60 oF**		Gas Pressure: **1,100 psig**		
	Saturated Gas?: ☑ Yes ☐ No		If no, water content?: na		
Dry Gas: (Downstream of Contact Tower)	Gas Flowrate: Actual: **5.0 MMscfd**			Design: **5.0 MMscfd**	
	Water Content: **7.0 lb/MMscf**				
Lean Glycol:	Circulation Rate: Actual[3]: **1.50 gpm**			Max[4]: **1.50 gpm**	
	Pump make/model: **Kimray 9015PV**				
Glycol Flash Tank (if applicable):	Temp: **na**		Pressure: **na**	Vented: ☐ Yes ☐ No	
	If no, describe vapor control: **na**				
Stripping Gas (if applicable):	Source of Gas **na**		Rate: **na**		

40 CFR Part 63; Subpart HH & HHH Registration Form - Continued

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 C1-C8, 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)

☑ Subject to Subpart HH -- However, *EXEMPT* because the facility is an area source of HAP emissions *and* the actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere is < 0.90 megagram per year (1.0 tpy); see 40CFR§63.764(e)(1)(ii).

☐ Subject to Subpart HHH

☐ Not Subject Because:

- ☐ < 10/25 TPY
- ☐ Affected facility exclusively handles black oil.
- ☐ Facility-wide actual annual average NG throughput is < 650 thousand scf/day and facility-wide actual annual average hydrocarbon liquid is < 250 bpd.
- ☐ No affected source is present.

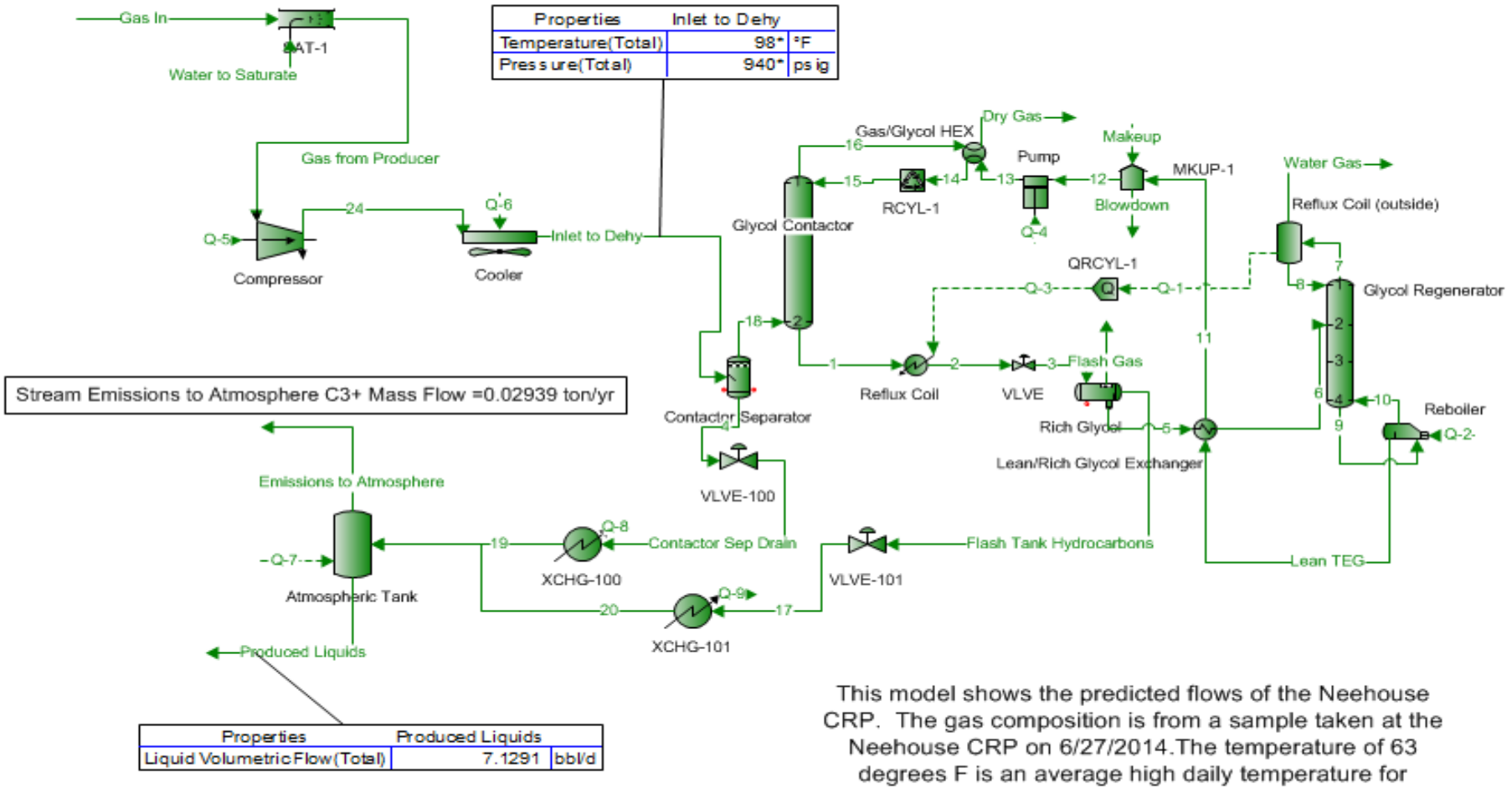
ATTACHMENT L - STORAGE TANK DATA SHEET

Source ID	Status	Contents	Volume (gal)	Diam (ft)	Thru-Put (gal/yr)	Orientation	Ave Liq Hght (ft)
T-01	New	Produced Water	8,820	12.0	105,840	Vert	8.0
Also the following Insignificant Storage Tanks:							
T-02	Existing	Triethylene Glycol	225	---	---	---	---
T-03	Existing	Spent Glycol	150	---	---	---	---
T-04	Existing	Methanol	55	---	---	---	---
T-05	Existing	Lube Oil	500	---	---	---	---
T-06	Existing	Used Oil	55	---	---	---	---

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.

Neehouse CRP



Properties	Inlet to Dehy	
Temperature(Total)	98*	°F
Pressure(Total)	940*	psig

Stream Emissions to Atmosphere C3+ Mass Flow =0.02939 ton/yr

Properties	Produced Liquids	
Liquid Volumetric Flow (Total)	7.1291	bbl/d

This model shows the predicted flows of the Neehouse CRP. The gas composition is from a sample taken at the Neehouse CRP on 6/27/2014.The temperature of 63 degrees F is an average high daily temperature for Morgantown, WV. Atmospheric pressure is assumed to be 14.7 psia.

Location:	Neehouse	
Condensate Volume:	2602.122	bbl/yr
Total VOC's:	0.03	ton/yr
VOC Emission Factor:	0.023	lb/bbl

Emissions to Atmosphere		
Temperature	°F	63
Pressure	psig	0
Mole Fraction Vapor	%	100

Produced Liquids		
Temperature	°F	63
Pressure	psig	0
Std Liquid Volumetric Flow	bbl/d	7.1291

Emissions to Atmosphere	
Component	**tons/year**
Water	0.01
TEG	0.00
Nitrogen	0.00
Methane	0.38
CO2	0.02
Ethane	0.09
Propane	0.02
i-Butane	0.00
n-Butane	0.00
i-Pentane	0.00
n-Pentane	0.00
2,2-Dimethylbutane	0.00
2,3-Dimethylbutane	0.00
2-Methylpentane	0.00
3-Methylpentane	0.00
Hexane	0.00
2,2-Dimethylpentane	0.00
Methylcyclopentane	0.00
Benzene	0.00
Cyclohexane	0.00
2-Methylhexane	0.00
2,3-Dimethylpentane	7.16E-06
3-Methylhexane	1.61E-05
1,t-2-Dimethylcyclopentane	2.90E-08
1,t-3Dimethylcyclopentane	2.19E-06
Heptane	1.51E-05
Methylcyclohexane	0.00E+00
2,5-Dimethylhexane	3.37E-07
2,3-Dimethylhexane	4.50E-06
Toluene	3.31E-04
2-Methylheptane	1.87E-06
4-Methylheptane	2.21E-06
3-Methylheptane	5.17E-06
1,t-4-Dimethylcyclohexane	9.12E-10
2,4,4-Trimethylhexane	1.25E-06
2,6-Dimethylheptane	5.59E-07
Octane	4.70E-06
Nonane	2.55E-06
Decane	2.94E-07
Undecane	5.23E-07
m-Xylene	0.000161417
Oxygen	4.39E-05

Produced Liquids	
Component	**mass fraction**
Water	99.99
TEG	0.00
Nitrogen	0.00
Methane	0.00
CO2	0.00
Ethane	0.00
Propane	0.00
i-Butane	0.00
n-Butane	0.00
i-Pentane	0.00
n-Pentane	0.00
2,2-Dimethylbutane	0.00
2,3-Dimethylbutane	0.00
2-Methylpentane	0.00
3-Methylpentane	0.00
Hexane	0.00
2,2-Dimethylpentane	0.00
Methylcyclopentane	0.00
Benzene	0.00
Cyclohexane	0.00
2-Methylhexane	0.00
2,3-Dimethylpentane	1.97E-08
3-Methylhexane	3.00E-08
1,t-2-Dimethylcyclopentane	1.05E-12
1,t-3Dimethylcyclopentane	3.21E-08
Heptane	3.13E-08
Methylcyclohexane	0.00E+00
2,5-Dimethylhexane	1.05E-10
2,3-Dimethylhexane	1.51E-08
Toluene	2.23E-04
2-Methylheptane	8.74E-10
4-Methylheptane	3.76E-09
3-Methylheptane	9.44E-09
1,t-4-Dimethylcyclohexane	6.18E-17
2,4,4-Trimethylhexane	3.48E-09
2,6-Dimethylheptane	3.40E-10
Octane	5.28E-09
Nonane	4.76E-09
Decane	3.39E-10
Undecane	8.11E-10
m-Xylene	0.000107345
Oxygen	2.32E-07

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

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

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

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Neehouse Compressor Station	2. Tank Name 210 bbl Produced Water Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) T01	4. Emission Point Identification No. (as assigned on *Equipment List Form*) 6E
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): na	

II. TANK INFORMATION (required)

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

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
105,840	290

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
12

15. Maximum tank fill rate (gal/min)

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

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

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

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

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

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

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

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

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

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

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

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

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

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

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

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

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

IV. SITE INFORMANTION (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^2·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)			

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

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

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

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method[1]
		Amount	Units		
VOC				260	EPA-450/3-85-001a and ProMax

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

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

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

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

Identification Number (as assigned on *Equipment List Form*): TLO

1. Loading Area Name: Neehouse Compressor Station

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): **N/A**

G Drums G Marine Vessels G Rail Tank Cars G Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?

G Yes G No G **Does not apply**

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: **N/A**

6. Are cargo vessels pressure tested for leaks at this or any other location? **N/A**

G Yes G No

If YES, describe:

7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	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					
Liquid Name		Prod. H2O					
Max. daily throughput (1000 gal/day)		0.29					
Max. annual throughput (1000 gal/yr)		105.84					
Loading Method [1]		SP					
Max. Fill Rate (gal/min)		200					
Average Fill Time (min/loading)		60					
Max. Bulk Liquid Temperature (°F)		60					
True Vapor Pressure [2]		1.5					
Cargo Vessel Condition [3]		U					
Control Equipment or Method [4]		None					
Minimum control efficiency (%)		N/A					
Maximum Emission Rate (VOC)	Loading (lb/hr)	---					
	Annual (lb/yr)	520					
Estimation Method [5]		EPA					

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)
O = other (descibe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
O = other (describe)

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

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

MONITORING	RECORDKEEPING
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

ATTACHMENT M

Air Pollution Control Device Sheet(s)

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

- NSCR on Caterpillar G3306TA Compressor Engine

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **01-NSCR (For CE-01/1E)**

Equipment Information

1. Manufacturer: **Miratech (or equivalent)** Model No: **RCS-1816-06 (or equivalent)**	2. Control Device Name: **NSCR for Compressor Engine CE-01/1E** Type: **Non-Selective Catalytic Reduction (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: **na (Assumed 100%, less Crankcase emissions (See RPC/7E)).** **(Guaranteed <u>control</u> efficiency: NOx: ≥88%; CO: ≥88%; NMNEHC (VOC): ≥50%; and HCHO: ≥50%)**	
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 of disposal.	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☐ Yes	☒ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor ☐ Particulate (type):	☒ Other **NOX, CO, VOC and HCHO**
17. Inlet gas velocity: **---**	18. Pollutant specific gravity: **NA**
19. Gas flow into the collector: **970 ACFM @ 1,064°F and 20" WC**	20. Gas stream temperature: Inlet: **1,064 °F** Outlet: **xxx °F**
21. Gas flow rate: Design Maximum: **970 ACFM** Average Expected: **970 ACFM**	22. Particulate Grain Loading in grains/scf: Inlet: **na** Outlet: **na**

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency%	OUT Pollutant		Control Efficiency%
	g/bhp-hr	grains/acf		g/bhp-hr	grains/acf	
NOx	16.57		100%	2.0		88%
CO	16.57		100%	2.0		88%
NMNEHC	0.37		100%	0.19		50%
HCHO	0.25		100%	0.13		50%

24. Dimensions of stack: Height ft. Diameter ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

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

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

na

28. Describe the collection material disposal system:

na

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

Yes, 01-NSCR emissions are reported w/ Compressor Engine 01 (CE-01/1E) emissions

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 Collection Efficiency for each air pollutant.

na (Assumed 100%, less Crankcase emissions (See RPC/2E)).

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

NOX: ≥88%; CO: ≥88%; NMNEHC (VOC): ≥50% and HCHO: ≥50%.

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

MIRATECH

CONFIDENTIAL

MIRATECH Emissions Control Equipment Specification Summary

Proposal Number: MC-12-3069

Engine Data

Number of Engines:	1
Application:	Gas Compression
Engine Manufacturer:	Caterpillar
Model Number:	G 3306 TA LCR
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:	RCS2-1816-06-HSG
Element Model Number:	IQ-RE-16EC
Number of Catalyst Layers:	1
Number of Spare Catalyst Layers:	1
System Pressure Loss:	2.0 inches of WC (Fresh)
Sound Attenuation:	25-30 dBA insertion loss
Exhaust Temperature Limits:	750 – 1250°F (catalyst inlet); 1350°F (catalyst outlet)

NSCR Housing & Catalyst Details

Model Number:	RCS2-1816-06-EC1
Material:	Carbon Steel
Approximate Diameter:	14/18 inches
Inlet Pipe Size & Connection:	6 inch FF Flange, 150# ANSI standard bolt pattern
Outlet Pipe Size & Connection:	6 inch FF Flange, 150# ANSI standard bolt pattern
Overall Length:	66 inches
Weight Without Catalyst:	202 lbs
Weight Including Catalyst:	224 lbs
Instrumentation Ports:	1 inlet/1 outlet/2 catalyst (1/2" NPT)
Oxygen Sensor Ports:	1 inlet/1 outlet (18mm)

Emission Requirements

Exhaust Gases	Engine Outputs (g/ bhp-hr)	Reduction (%)	Warranted Converter Outputs (g/ bhp-hr)	Requested Emissions Targets
NOx	16.57	88%	1.99	88 % Reduction
CO	16.57	88%	1.99	88 % Reduction
NMNEHC	0.12 or 0.37	50%	0.06	50 % Reduction
CH_2O	0.25	50%	0.13	50 % Reduction
Oxygen	0.5%			

MIRATECH warrants the performance of the converter, as stated above, per the MIRATECH General Terms and Conditions of Sale.

ATTACHMENT N

Supporting Emissions Calculations

"30. Provide all **Supporting Emissions Calculations** as Attachment N."

- **Emission Summary Spreadsheets**
  - Potential to Emit (PTE) – CONTROLLED CRITERIA POLLUTANTS
  - Potential to Emit (PTE) – CONTROLLED HAZARDOUS AIR POLLUTANTS
  - Potential to Emit (PTE) – GREENHOUSE GASES (GHG)
  - Potential to Emit (PTE) – PRE-CONTROLLED CRITERIA POLLUTANTS
  - Potential to Emit (PTE) – PRE-CONTROLLED HAZARDOUS AIR POLLUTANTS
- **Unit-Specific Emission Spreadsheets**
  - Compressor Engine – 203 bhp Caterpillar G3306TA (4SRB@1,800 rpm)
  - Compressor Rod Packing and Engine Crankcase (RPC)
  - Startup/Shutdown/Maintenance (SSM)
  - Triethylene Glycol (TEG) Dehydrator – 5.0 MMscfd
  - Triethylene Glycol (TEG) Reboiler – 0.14 MMBtu/hr
  - Storage Tank – 210 bbl Produced Water
  - Truck Load-Out – 2,520 bbl/yr Produced Water
  - Process Piping Fugitives – Gas & Water/Oil
- **AP-42 and GHG Emission Factors**
- **Model Results - Dehydrator - GRI-GLYCalc 4.0**
  - Summary of Emissions
  - Summary of Input Values
  - Aggregate Calculations Report

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE 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-NSCR	Compressor Engine - Caterpillar G3306TA	203 bhp	**0.89**	**3.90**	**0.89**	**3.90**	**0.14**	**0.61**	1.1E-03	4.7E-03	0.04	0.15
RPC	2E	na	Compressor Rod Packing/Engine Crankcase	203 bhp	---	---	---	---	0.54	2.37	---	---	---	---
SSM	3E	na	Startup/Shutdown/Maintenance (Blowdown)	203 bhp	---	---	---	---	---	2.47	---	---	---	---
RSV-01	4E	na	TEG Dehydrator - Still Vent	5.0 MMscfd	---	---	---	---	10.71	46.92	---	---	---	---
RBV-01	5E	na	TEG Dehydrator - Reboiler	0.14 MMBtu/hr	0.01	0.06	0.01	0.05	7.8E-04	0.00	8.2E-05	3.6E-04	1.0E-03	0.00
T-01	6E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.13	---	---	---	---
TLO-1	7E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.08	---	---	---	---
			TOTAL POINT SOURCE PTE:		**0.90**	**3.96**	**0.90**	**3.95**	**11.41**	**52.58**	**1.2E-03**	**0.01**	**0.04**	**0.16**
			WV-DEP Permit Threshold:		6 lb/hr ***AND*** 10 tpy		6 lb/hr ***AND*** 10 tpy		**6 lb/hr *AND* 10 tpy**		6 lb/hr ***AND*** 10 tpy		6 lb/hr ***AND*** 10 tpy	
			Title V Permit Threshold:		---	100	---	100	---	100	---	100	---	100
FUG-G	**1F**	**na**	**Process Piping Fugitives - Gas**	**1,737 fittings**	**---**	**---**	**---**	**---**	**1.27**	**5.58**	**---**	**---**	**---**	**---**
FUG-W	**2F**	**na**	**Process Piping Fugitives - Water/Oil**	**871 fittings**	**---**	**---**	**---**	**---**	**0.88**	**3.84**	**---**	**---**	**---**	**---**
			TOTAL FUGITIVE SOURCE PTE:		**---**	**---**	**---**	**---**	**2.15**	**9.42**	**---**	**---**	**---**	**---**
			TOTAL PTE:		**0.90**	**3.96**	**0.90**	**3.95**	**13.56**	**62.00**	**1.2E-03**	**0.01**	**0.04**	**0.16**

BOLD and Shaded Cells Indicate Control Technology used to establish emission limitation.

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM/3E) and Truck Load-Out (TLO/7E) 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.)

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	**1.4E-03**	**0.01**	**2.3E-05**	**9.9E-05**	**0.06**	**0.25**	**---**	**---**	**2.8E-03**	**0.01**	**5.1E-04**	**2.2E-03**	**---**	**---**	**1.8E-04**	**7.8E-04**	**0.01**	**0.03**	**0.07**	**0.29**
RPC	2E	1.9E-03	0.01	1.9E-03	0.01	1.4E-03	0.01	1.9E-03	0.01	---	---	1.9E-03	0.01	1.9E-03	0.01	1.9E-03	0.01	---	---	0.01	0.06
SSM	3E	---	1.4E-03	---	1.4E-03	---	---	---	0.03	---	---	---	1.4E-03	---	1.4E-03	---	1.4E-03	---	---	---	0.03
RSV-01	4E	0.13	0.56	0.03	0.11	---	---	0.22	0.96	---	---	0.57	2.50	1.0E-03	4.4E-03	0.64	2.79	---	---	1.58	6.93
RBV-01	5E	2.9E-07	1.3E-06	---	---	1.0E-05	4.5E-05	2.5E-04	1.1E-03	---	---	4.7E-07	2.0E-06	---	---	---	---	2.6E-07	1.1E-06	2.6E-04	1.1E-03
T-01	6E	5.3E-04	2.4E-03	5.3E-04	2.4E-03	---	---	1.8E-03	0.01	---	---	5.3E-04	2.4E-03	5.3E-04	2.4E-03	5.3E-04	2.4E-03	---	---	4.4E-03	0.02
TLO-1	7E	---	4.2E-03	---	4.2E-03	---	---	---	4.2E-03	---	---	---	4.2E-03	---	4.2E-03	---	4.2E-03	---	---	---	0.03
Subtotal:		**0.13**	**0.58**	**0.03**	**0.13**	**0.06**	**0.25**	**0.22**	**1.01**	**2.8E-03**	**0.01**	**0.57**	**2.52**	**3.4E-03**	**0.02**	**0.64**	**2.81**	**0.01**	**0.03**	**1.67**	**7.35**
FUG-G	1F	7.4E-04	3.2E-03	7.4E-04	3.2E-03	---	---	0.01	0.06	---	---	7.4E-04	3.2E-03	7.4E-04	3.2E-03	7.4E-04	3.2E-03	---	---	0.02	0.07
FUG-W	2F	0.03	0.12	0.03	0.12	---	---	0.09	0.38	---	---	0.03	0.12	0.03	0.12	0.03	0.12	---	---	0.22	0.96
Subtotal:		**0.03**	**0.12**	**0.03**	**0.12**	**---**	**---**	**0.10**	**0.44**	**---**	**---**	**0.03**	**0.12**	**0.03**	**0.12**	**0.03**	**0.12**	**---**	**---**	**0.24**	**1.03**
TOTAL PTE:		**0.16**	**0.70**	**0.05**	**0.24**	**0.06**	**0.25**	**0.32**	**1.45**	**2.8E-03**	**0.01**	**0.60**	**2.64**	**0.03**	**0.14**	**0.67**	**2.93**	**0.01**	**0.03**	**1.90**	**8.39**
WV-DEP:		**2 lb/hr *OR* 0.5 tpy**		2 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 0.5 tpy		2 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		3 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		3 lb/hr ***OR*** 5 tpy		**2 lb/hr *OR* 5 tpy**	
Title V:		---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	25

BOLD and Shaded Cells Indicate Control Technology used to establish emission limitation.

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM/3E) and Truck Load-Out (TLO/7E) emission generating activities are infrequent.
2 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

Greenhouse Gas (GHG) Emissions

Unit ID	Point ID	Control ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: GWP: CO2 tpy	53.06 1 CO2e tpy	kg/MMBtu: GWP: CH4 tpy	1.00E-03 25 CO2e tpy	kg/MMBtu: GWP: N2O tpy	1.00E-04 298 CO2e tpy	TOTAL CO2e tpy
CE-01	**1E**	01-NSCR	Compressor Engine - Caterpillar G3306TA	1.83	8,760	1,119	1,119	2.00	50	1.8E-03	0.52	**1,170**
RPC	**2E**	na	Compressor Rod Packing/Engine Crankcase	---	8,760	14.15	14.15	12.80	320	---	---	**334**
SSM	**3E**	na	Startup/Shutdown/Maintenance (Blowdown)	---	8,760	0.04	0.04	8.62	216	---	---	**216**
RSV-01	**4E**	na	TEG Dehydrator - Still Vent	---	8,760	1.56	1.56	143	3,584	---	---	**3,585**
RBV-01	**5E**	na	TEG Dehydrator - Reboiler	0.14	8,760	72.14	72.14	1.4E-03	0.03	1.3E-03	0.39	**73**
T-01	**6E**	na	Storage Tank - Produced Water	---	8,760	2.1E-03	2.1E-03	0.30	7.55	---	---	**8**
TLO-1	**7E**	na	Truck Load-Out - Produced Water	---	---	---	---	---	---	---	---	**---**
											TOTAL POINT SOURCE PTE:	**5,385**
FUG-G	**1F**	na	Process Piping Fugitives - Gas	---	8,760	0.09	0.09	23.79	594.84	---	---	595
FUG-W	**2F**	na	Process Piping Fugitives - Water/Oil	---	8,760	0.01	0.01	1.15	28.80	---	---	29
											TOTAL FUGITIVE SOURCE PTE:	**624**

TOTAL FACILITY-WIDE PTE:	**1,207**		**192**		**3.1E-03**		**12,018**
WV-DEP Threshold: (	**na**	**- OR -**	**na**	**- OR -**	**na**	**) - AND -**	**na**
Title V Permit Threshold:	**na**		**na**		**na**		**na**

Notes:
1 - Emissions are based on operation at 100% of rated load.
2 - Engine CO2 and CH4 emissions are based on vendor specifications.
3 - Fugitive CH4 emissions are based on EPA Fugitive Emission Factors for Oil and Gas Production Operations.
4 - All other GHG emissions are based on default values in 40CFR98, Subpart C, Table C-1.
5 - GHG NSR/PSD Thresholds and Title V Major Source Thresholds are applicable only if other regulated air pollutants exceed the corresponding Thresholds.

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-NSCR	Compressor Engine - Caterpillar G3306TA	203 bhp	**7.42**	**32.48**	**7.42**	**32.48**	**0.28**	**1.22**	1.1E-03	4.7E-03	0.04	0.15
RPC	2E	na	Compressor Rod Packing/Engine Crankcase	203 bhp	---	---	---	---	0.54	2.37	---	---	---	---
SSM	3E	na	Startup/Shutdown/Maintenance (Blowdown)	203 bhp	---	---	---	---	---	2.47	---	---	---	---
RSV-01	4E	na	TEG Dehydrator - Still Vent	5.0 MMscfd	---	---	---	---	10.71	46.92	---	---	---	---
RBV-01	5E	na	TEG Dehydrator - Reboiler	0.14 MMBtu/hr	0.01	0.06	0.01	0.05	7.8E-04	3.4E-03	8.2E-05	3.6E-04	1.0E-03	4.6E-03
T-01	6E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.13	---	---	---	---
TLO-1	7E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.08	---	---	---	---
			TOTAL POINT SOURCE PTE:		**7.43**	**32.54**	**7.43**	**32.53**	**11.55**	**53.19**	**1.2E-03**	**0.01**	**0.04**	**0.16**
			WV-DEP Permit Threshold:		6 lb/hr ***AND*** 10 tpy		6 lb/hr ***AND*** 10 tpy		**6 lb/hr *AND* 10 tpy**		6 lb/hr ***AND*** 10 tpy		6 lb/hr ***AND*** 10 tpy	
			Title V Permit Threshold:		---	100	---	100	---	100	---	100	---	100
FUG-G	1F	na	Process Piping Fugitives - Gas	**1,737 fittings**	**---**	**---**	**---**	**---**	**1.27**	**5.58**	**---**	**---**	**---**	**---**
FUG-W	2F	na	Process Piping Fugitives - Water/Oil	**871 fittings**	**---**	**---**	**---**	**---**	**0.88**	**3.84**	**---**	**---**	**---**	**---**
			TOTAL FUGITIVE SOURCE PTE:		**---**	**---**	**---**	**---**	**2.15**	**9.42**	**---**	**---**	**---**	**---**
			TOTAL PTE:		**7.43**	**32.54**	**7.43**	**32.53**	**13.70**	**62.60**	**1.2E-03**	**0.01**	**0.04**	**0.16**

BOLD and Shaded Cells Indicate Control Technology used to establish emission limitation.

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.

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.)

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	**1.4E-03**	**0.01**	**2.3E-05**	**9.9E-05**	**0.06**	**0.25**	**---**	**---**	**2.8E-03**	**0.01**	**5.1E-04**	**2.2E-03**	**---**	**---**	**1.8E-04**	**7.8E-04**	**0.01**	**0.03**	**0.07**	**0.29**
RPC	2E	1.9E-03	0.01	1.9E-03	0.01	1.4E-03	0.01	1.9E-03	0.01	---	---	1.9E-03	0.01	1.9E-03	0.01	1.9E-03	0.01	---	---	0.01	0.06
SSM	3E	---	1.4E-03	---	1.4E-03	---	---	---	0.03	---	---	---	1.4E-03	---	1.4E-03	---	1.4E-03	---	---	---	0.03
RSV-01	4E	0.13	0.56	0.03	0.11	---	---	0.22	0.96	---	---	0.57	2.50	1.0E-03	4.4E-03	0.64	2.79	---	---	1.58	6.93
RBV-01	5E	2.9E-07	1.3E-06	---	---	1.0E-05	4.5E-05	2.5E-04	1.1E-03	---	---	4.7E-07	2.0E-06	---	---	---	---	2.6E-07	1.1E-06	2.6E-04	1.1E-03
T-01	6E	5.3E-04	2.4E-03	5.3E-04	2.4E-03	---	---	1.8E-03	0.01	---	---	5.3E-04	2.4E-03	5.3E-04	2.4E-03	5.3E-04	2.4E-03	---	---	4.4E-03	0.02
TLO-1	7E	---	4.2E-03	---	4.2E-03	---	---	---	4.2E-03	---	---	---	4.2E-03	---	4.2E-03	---	4.2E-03	---	---	---	0.03
Subtotal:		**0.13**	**0.58**	**0.03**	**0.13**	**0.06**	**0.25**	**0.22**	**1.01**	**2.8E-03**	**0.01**	**0.57**	**2.52**	**3.4E-03**	**0.02**	**0.64**	**2.81**	**0.01**	**0.03**	**1.67**	**7.35**
FUG-G	1F	7.4E-04	3.2E-03	7.4E-04	3.2E-03	---	---	0.01	0.06	---	---	7.4E-04	3.2E-03	7.4E-04	3.2E-03	7.4E-04	3.2E-03	---	---	0.02	0.07
FUG-W	2F	0.03	0.12	0.03	0.12	---	---	0.09	0.38	---	---	0.03	0.12	0.03	0.12	0.03	0.12	---	---	0.22	0.96
Subtotal:		**0.03**	**0.12**	**0.03**	**0.12**	**---**	**---**	**0.10**	**0.44**	**---**	**---**	**0.03**	**0.12**	**0.03**	**0.12**	**0.03**	**0.12**	**---**	**---**	**0.24**	**1.03**
TOTAL PTE:		**0.16**	**0.70**	**0.05**	**0.24**	**0.06**	**0.25**	**0.32**	**1.45**	**2.8E-03**	**0.01**	**0.60**	**2.64**	**0.03**	**0.14**	**0.67**	**2.93**	**0.01**	**0.03**	**1.90**	**8.39**
WV-DEP:		**2 lb/hr *OR* 0.5 tpy**		2 lb/hr ***OR*** 5 tpy		**2 lb/hr *OR* 0.5 tpy**		2 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		3 lb/hr ***OR*** 5 tpy		2 lb/hr ***OR*** 5 tpy		3 lb/hr ***OR*** 5 tpy		**2 lb/hr *OR* 5 tpy**	
Title V:		---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	25

BOLD and Shaded Cells Indicate Control Technology used to establish emission limitation.

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM/3E) and Truck Load-Out (TLO/7E) emission generating activities are infrequent.
2 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

Compressor Engine 01– 203 bhp CAT G3306TA (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-01/1E	**Engine 01**	Vendor Guarantee	NOx	16.57	4.07	7.42	32.48	88.0%	**1.99**	**0.49**	**0.89**	**3.90**
		Vendor Guarantee	CO	16.57	4.07	7.42	32.48	88.0%	**1.99**	**0.49**	**0.89**	**3.90**
	Caterpillar (CAT)	Vendor Guarantee	THC	2.22	0.55	0.99	4.35	8.3%	**2.04**	**0.50**	**0.91**	**3.99**
	G3306TA	NMHC+CH4	NMHC	1.20	0.29	0.54	2.35	15.4%	**1.02**	**0.25**	**0.45**	**1.99**
	203 bhp (Site Rating)	Vendor Guarantee	NMNEHC	0.37	0.09	0.17	0.73	50.0%	**0.19**	**0.05**	**0.08**	**0.36**
	1,800 rpm	NMNEHC+HCHO	VOC	0.62	0.11	0.28	1.22	50.0%	**0.31**	**0.06**	**0.14**	**0.61**
	4SRB / AFRC	AP-42 Table 3.2-3	SO2	2.4E-03	5.9E-04	1.1E-03	4.7E-03	---	**2.4E-03**	**5.9E-04**	**1.1E-03**	**4.7E-03**
	Miratech NSCR	AP-42 Table 3.2-3	PM10/2.5	0.08	0.02	0.04	0.15	---	**0.08**	**0.02**	**0.04**	**0.15**
	NSPS JJJJ Exempt	AP-42 Table 3.2-3	Benzene	0.01	1.6E-03	2.9E-03	0.01	50.0%	**3.2E-03**	**7.9E-04**	**1.4E-03**	**0.01**
	8,760 hr/yr	AP-42 Table 3.2-3	Ethylbenzene	1.0E-04	2.5E-05	4.5E-05	2.0E-04	50.0%	**5.0E-05**	**1.2E-05**	**2.3E-05**	**9.9E-05**
	920 Btu/scf (LHV)	Vendor Guarantee	HCHO	0.25	0.02	0.11	0.49	50.0%	**0.13**	**0.01**	**0.06**	**0.25**
	1,020 Btu/scf (HHV)	AP-42 Table 3.2-3	n-Hexane	---	---	---	---	50.0%	**---**	**---**	**---**	**---**
	8,098 Btu/bhp-hr (LHV)	AP-42 Table 3.2-3	Methanol	0.01	3.1E-03	5.6E-03	0.02	50.0%	**0.01**	**1.5E-03**	**2.8E-03**	**0.01**
	8,978 Btu/bhp-hr (HHV)	AP-42 Table 3.2-3	Toluene	2.3E-03	5.6E-04	1.0E-03	4.5E-03	50.0%	**0.00**	**2.8E-04**	**5.1E-04**	**2.2E-03**
	1.64 MMBtu/hr (LHV)	AP-42 Table 3.2-3	2,2,4-TMP	---	---	---	---	50.0%	**---**	**---**	**---**	**---**
	1.83 MMBtu/hr (HHV)	AP-42 Table 3.2-3	Xylenes	7.9E-04	2.0E-04	3.6E-04	1.6E-03	50.0%	**4.0E-04**	**9.8E-05**	**1.8E-04**	**7.8E-04**
	14,401 MMBtu/yr (LHV)	AP-42 Table 3.2-3	Other HAP	0.03	0.01	0.01	0.05	50.0%	**0.01**	**3.2E-03**	**0.01**	**0.03**
	16,001 MMBtu/yr (HHV)	Sum	Total HAP	0.30	0.03	0.13	0.58	50.0%	**0.15**	**0.02**	**0.07**	**0.29**
	1,787 scf/hr	Vendor Guarantee	CO2	571	140	256	1,119	---	**571**	**140**	**256**	**1,119**
	0.04 MMscfd	THC-NMHC	CH4	1.02	0.25	0.46	2.00	---	**1.02**	**0.25**	**0.46**	**2.00**
	15.65 MMscf/yr	40CFR98 - Table C-2	N2O	9.0E-04	2.2E-04	4.0E-04	1.8E-03	---	**9.0E-04**	**2.2E-04**	**4.0E-04**	**1.8E-03**
		40CFR98 - Table A-1	CO2e	597	147	267	1,170	---	**597**	**147**	**267**	**1,170**

Notes:
1 - The emissions are based on operation at 100% of rated load for 8,760 hr/yr.
2 - As per Engine Specifications, emission values are based on adjustment to specified NOX level, all other emission values are "Not to Exceed" (i.e., Vendor Guarantee).
3 - As per Engine Specifications, NMNEHC (non-methane/non-ethane hydrocarbon) does 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; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.
6 - The control efficiency (CE) for each HAP is assumed to be the same as the CE for NMHC, except for HCHO where the vendor provides specific data.
7 - 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.
8 - Only the calculations based on Vendor Guarantees should be used to establish emission limitations.

Rod Packing/Crankcase Leaks (RPC)

Rod Packing Leaks (Natural Gas)

Unit ID	Unit Description	Number of Comp-ressors*	Cyl's per Comp-ressor	scfh per Cyl	Contin-gency	Total Fugitive Leak Rate	VOC 7,800 lb/MMscf		HCHO na lb/MMscf		n-Hex, BTEX, 2,2,4-TMP (ea) 27 lb/MMscf		Total HAP 160 lb/MMscf		CO2 200 lb/MMscf		CH4 42,275 lb/MMscf		CO2e 1,057,075 lb/MMscf	
						MMscf/yr	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RPC/2E	Rod Packing Leaks	1	4	15	15%	0.60	0.54	2.36	na	na	1.8E-03	0.01	0.01	0.05	0.01	0.1	3	13	73	319

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 13.76 lb/MMscf		HCHO 5.55 lb/MMscf		n-Hex, BTEX, 2,2,4-TMP (ea) 0.18 lb/MMscf		Total HAP 6.61 lb/MMscf		CO2 12,673 lb/MMscf		CH4 23 lb/MMscf		CO2e 13,239 lb/MMscf	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RPC/2E	Crankcase Emissions	203	0.89	250%	3.5E-03	0.02	1.4E-03	0.01	4.5E-05	2.0E-04	0.00	0.01	3	14	0.01	0.03	3	15		

	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
TOTAL RPC EMISSIONS:	**0.54**	**2.37**	**1.4E-03**	**0.01**	**1.9E-03**	**0.01**	**0.01**	**0.06**	**3**	**14**	**3**	**13**	**76**	**334**

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	151 lb/MMscf	200 lb/MMscf
CH4	34,698 lb/MMscf	42,275 lb/MMscf
VOC	6,456 lb/MMscf	7,800 lb/MMscf
BTEX, n-Hex, TMP (ea)	20 lb/MMscf	27 lb/MMscf
Total HAP	119 lb/MMscf	160 lb/MMscf

4 - Total Misc. Equipment Fugitive Leak Rate (scf/yr) = No. of Compressors * Cylinders/Compressor * scfh/Cylinder * 8760 hr/yr * (1 + Contingency)

5 - 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) 970 ft3/min (acf/min) 177 MMscf/yr TEEx*

Pollutant	G3306TA PTE	Crankcase Emission Factor**
Crankcase THC emissions (Mass)	4.35 tpy THC	49.27 lb THC / MMscf TEEx
Crankcase VOC emissions (Mass)	1.22 tpy VOC	13.76 lb VOC / MMscf TEEx
Crankcase HCHO emissions (Mass)	0.49 tpy HCHO	5.55 lb HCHO / MMscf TEEx
Crankcase BTEX (ea) emissions (Mass)	0.02 tpy BTEX (ea)	0.18 lb BTEX (ea) / MMscf TEEx
Crankcase HAP emissions (Mass)	0.58 tpy HAP	6.61 lb HAP / MMscf TEEx
Crankcase CO2 emissions (Mass)	1,119 tpy CO2	12,673 lb CO2 / MMscf TEEx
Crankcase CH4 emissions (Mass)	2 tpy CH4	23 lb CH4 / MMscf TEEx
Crankcase CO2e emissions (Mass)	1,170 tpy CO2e	13,245 lb CO2e /MMscf TEEx

* Conversion from acf/min to scf/yr based on 8,760 hr/yr, 1064 oF exhaust temp, and 68 oF std temp.

** Crankcase Emission Factor = PTE (tpy) from a G3516B Engine ÷ Total Engine Exhaust (TEEx) (MMscfy/yr).

Williams Ohio Valley Midstream LLC (OVM)

NEEHOUSE COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Startup/Shutdown/Maintenance (Blowdown)

Unit ID (Point ID)	Description	No of Comp-ressor Units	Total bhp	SSM and Blowdown Events/yr	a. Engine "Cold-Start" Gas Volume scf/SSM	b. Blowdown Gas Volume scf/SSM	Total Gas Vented MMscf/yr	VOC 12,100 lb/MMscf tpy	n-Hexane 125 lb/MMscf tpy	BTEX, TMP 7 lb/MMscf tpy	Total HAP 160 lb/MMscf tpy	CO2 200 lb/MMscf tpy	CH4 42,275 lb/MMscf tpy	CO2e GWP = 25 tpy
SSM (3E)	a. Cold Start (Engine)	1	203	208	700	1,262	0.15	0.88	0.01	5.1E-04	0.01	0.01	3	77
	b. Blowdown (Recip Comp)			208			0.26	1.59	0.02	9.2E-04	0.02	0.03	6	139
TOTAL FACILITY-WIDE SSM EMISSIONS:								**2.47**	**0.03**	**1.4E-03**	**0.03**	**0.04**	**9**	**216**

Notes: 1 - SSM Emissions are the sum of: a. Unburned fuel resulting from "cold-start" of idle gas-fired engine; and

b. Natural gas that is purged (aka blowdown) from the compressor and associated piping and equipment.

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.)

Engines	a. Unburned "Cold-Start" Gas is Constant at:	700 scf/start
	b. Blowdown Gas is Related to bhp at:	6.22 scf/bhp/B-D

3 - To be conservative, the following gas characteristics were assumed:

Pollutant	Inlet Gas Analysis	Estimated
Carbon Dioxide	151 lb/MMscf	200 lb/MMscf
Methane	34,698 lb/MMscf	42,275 lb/MMscf
VOC (Propane)	10,053 lb/MMscf	12,100 lb/MMscf
n-Hexane	103 lb/MMscf	125 lb/MMscf
BTEX, TMP (ea)	3 lb/MMscf	7 lb/MMscf
Total HAP:	119 lb/MMscf	160 lb/MMscf

4 - Emission estimates are conservatively based on:

4.0	Starts-Stops per week per Engine.
4.0	Blowdown(s) per week per Compressor

Dehydrator 01 (Still Vent) - 5.0 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	Dehydrator 01 (Still Vent)	---	NOX	---	---	---	---	---	---	---
		---	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	VOC	---	---	10.71	46.92	---	**10.71**	**46.92**
		---	SO2	---	---	---	---	---	---	---
		---	PM10/2.5	---	---	---	---	---	---	---
	5.0 MMscfd	GRI-GLYCalc 4.0	Benzene	---	---	0.13	0.56	---	**0.13**	**0.56**
		GRI-GLYCalc 4.0	Ethylbenzene	---	---	0.03	0.11	---	**0.03**	**0.11**
		---	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	---	---	2.2E-01	0.96	---	**0.22**	**0.96**
	8,760 Hr/yr	GRI-GLYCalc 4.0	Methanol	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Toluene	---	---	0.57	2.50	---	**0.57**	**2.50**
		GRI-GLYCalc 4.0	2,2,4-TMP	---	---	0.00	0.00	---	**0.00**	**0.00**
	0.21 MMscf/hr	GRI-GLYCalc 4.0	Xylenes	---	---	0.64	2.79	---	**0.64**	**2.79**
	1,825 MMscf/yr	GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Total HAP	---	---	1.58	6.93	---	**1.58**	**6.93**
	NESHAP HH - Exempt	GRI-GLYCalc 4.0	CO2	---	---	0.36	1.56	---	**0.36**	**1.56**
		GRI-GLYCalc 4.0	CH4	---	---	32.73	143.35	---	**32.73**	**143.35**
		GRI-GLYCalc 4.0	N2O	---	---	---	---	---	---	---
		40CFR98 - Table A-1	CO2e	---	---	819	3,585	---	**819**	**3,585**

Notes: 1 - To be conservative, and to account for potential future changes in gas quality, the following worst-case emissions were assumed:

5.0 MMscfd Dehydrator 01	GRI-GLYCalc 4.0* Model Results		Worst-Case (W/ 120% Margin)	
THC	45.61 lb/hr	199.76 tpy	54.73 lb/hr	239.72 tpy
NMNEHC = VOC	8.93 lb/hr	39.10 tpy	10.71 lb/hr	46.92 tpy
Benzene	0.11 lb/hr	0.47 tpy	0.13 lb/hr	0.56 tpy
Ethylbenzene	0.02 lb/hr	0.09 tpy	0.03 lb/hr	0.11 tpy
HCHO	---	---	---	---
n-Hexane	0.18 lb/hr	0.80 tpy	0.22 lb/hr	0.96 tpy
Methanol	---	---	---	---
Toluene	0.48 lb/hr	2.08 tpy	0.57 lb/hr	2.50 tpy
2,2,4-TMP	0.001 lb/hr	0.004 lb/hr	0.001 lb/hr	0.004 lb/hr
Xylenes	0.53 lb/hr	2.33 tpy	0.64 lb/hr	2.79 tpy
Other HAP	---	---	---	---
Total HAP	1.32 lb/hr	5.77 tpy	1.58 lb/hr	6.93 tpy
CO2	0.30 lb/hr	1.30 tpy	0.36 lb/hr	1.56 tpy
CH4	27.27 lb/hr	119.46 tpy	32.73 lb/hr	143.35 tpy
CO2e	682 lb/hr	2,988 tpy	818 lb/hr	3,584 tpy

***Dehydrator Operating Parameters**
(See Attachments H - Extended Gas Analysis and L - GRI-GLYCalc Model results)

Dry Gas Flow Rate:	5.0 MMscfd	Extended Gas Analysis:	06/27/14
Wet Gas Temperature:	60 oF	Flash Tank Temperature:	na
Wet Gas Pressure:	1,100 psig	Flash Tank Pressure:	na
Wet Gas Water Content:	Saturated	Flash Tank Off-Gas:	na
Dry Gas Water Content:	7.00 lb-H2O/MMscf	Stripping Gas:	na
Lean Glycol Water Content:	1.50 wt% H2O	Stripping Gas Flow Rate:	na
Glycol Pump Type:	Gas Injection	Regen Overhead Control:	na
Glycol Pump Model:	Kimray 9015PV	Condenser Temperature:	na
Lean Glycol Circulation Rate:	1.50 gpm	Condenser Pressure:	na

Additional GRI-GLYCalc 4.0 Model Results:

Wet Gas Water Content:	16.04 lb/MMscf	Flash Tank Stream:	na
Lean Glycol Recirc Ratio:	27.81 gal/lb-H2O	Regen Overhead Stream:	896 scfh

Reboiler 01 - 0.14 MMBtu/hr

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy	%	lb/hr	tpy
		EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.01	0.06	na	**0.01**	**0.06**
	Reboiler 01	EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.01	0.05	na	**0.01**	**0.05**
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	7.8E-04	3.4E-03	na	**7.8E-04**	**3.4E-03**
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	8.2E-05	3.6E-04	na	**8.2E-05**	**3.6E-04**
	0.13 MMBtu/hr (LHV)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	1.0E-03	4.6E-03	na	**1.0E-03**	**4.6E-03**
	0.14 MMBtu/hr (HHV)	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	2.9E-07	1.3E-06	na	**2.9E-07**	**1.3E-06**
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	**---**	**---**
	8,760 hr/yr	EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	1.0E-05	4.5E-05	na	**1.0E-05**	**4.5E-05**
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	2.5E-04	1.1E-03	na	**2.5E-04**	**1.1E-03**
RBV-01/5E		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	4.7E-07	2.0E-06	---	**4.7E-07**	**2.0E-06**
	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	---	---	---	---	---	**---**	**---**
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	2.6E-07	1.1E-06	na	**2.6E-07**	**1.1E-06**
	137 scf/hr	EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	2.6E-04	1.1E-03	na	**2.6E-04**	**1.1E-03**
	3.29 Mscfd	EPA AP-42 Table 1.4-2	CO2	120,000	118	16	72	na	**16**	**72**
	1.20 MMscf/yr	EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	3.2E-04	1.4E-03	na	**3.2E-04**	**1.4E-03**
		EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	3.0E-04	1.3E-03	na	**3.0E-04**	**1.3E-03**
		40CFR98 - Table A-1	CO2e	120,713	118	17	73	na	**17**	**73**

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.

Storage Tank - Produced Water

Unit ID (Point ID)	Material Stored	Capa-city bbl	Turn-overs /yr	T-Put bbl/yr	EPA-450/ (Working and Breathing Losses)	ProMax (Flashing Losses)	VOC 100.00 Wgt%		n-Hexane 10.00 Wgt%		BTEX, TMP-ea 3.00 Wgt%		Total HAP 25.00 Wgt%		CO2 1.00 Wgt%		CH4 30.00 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
T-01/6E	Prod H2O	210	12.0	2,520	0.039 lb/bbl	0.023 lb/bbl	0.02	0.08	1.8E-03	0.01	5.3E-04	2.3E-03	4.4E-03	0.02	1.8E-04	7.7E-04	0.01	0.02	0.13	1
TOTAL VOLUME:		**210**	**12.0**	**2,520**																

Unit ID (Point ID)	Material Stored	Capa-city bbl	Turn-overs /yr	T-Put bbl/yr	Tank Volume	Blanket Gas Volume	VOC 7,800 lb/MMcf		n-Hexane 125 lb/MMcf		BTEX, TMP-ea 7 lb/MMcf		Total HAP 160 lb/MMcf		CO2 200 lb/MMcf		CH4 42,275 lb/MMcf		CO2e GWP = 25	
							lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
T-01/6E	Prod H2O	210	12.0	2,520	1,100 scf	13,195 scf	---	0.05	---	8.2E-04	---	4.6E-05	---	1.1E-03	---	1.3E-03	---	0.28	---	7
TOTAL VOLUME:		**210**	**12.0**	**2,520**																
TOTAL EMISSIONS:							**0.02**	**0.13**	**1.8E-03**	**0.01**	**5.3E-04**	**2.4E-03**	**4.4E-03**	**0.02**	**1.8E-04**	**2.1E-03**	**0.01**	**0.30**	**0.13**	**8**

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 water/oil storage tank working and breathing losses. 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 = 0.03889 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.

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 - Total HAP is estimated at 25.0% of VOC emissions. This is a very conservative estimate based on an investigation of other produced water emission estimating protocols, as exemplified above (e.g., (0.0001+0.0003+0.000006+0.00006)*100 = 4.7%).

4 - The ProMax Simulation software was used to estimate flashing losses from the produced water storage tank.

5 - A natural gas blanket **may** be used on the produced water tank to prevent air from entering the tank and causing an explosion. Field natural gas would be used as the blanket gas.

Produced Water - Truck Load-Out 01

Unit ID	Description	S sat. fac.	P psia	M lb/lb-mol	T °R	CE %	L_L 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-01/7E	Truck Load-Out - Produced Water	1.45	1.5	30.0	510	0.0%	1.59	106	0.08	4.2E-03	0.03
								TOTAL:	**0.08**	**4.2E-03**	**0.03**

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_L = 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:	**210**	bbl	=	**8,820**	gal.
4 - It is estimated that each tank will be emptied up to:	**12**	t-o/yr	=	**2,520**	bbl/yr

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.

Piping and Equipment Fugitives - Gas & Water/Oil

Unit ID	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC)		VOC 23.44 Wgt%		n-Hexane 0.24 Wgt%		BTEX, TMP-ea 0.01 Wgt%		Total HAP 0.31 Wgt%		CO2 0.39 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	lb/hr	tpy
FUG-G/1F	Process Piping Fugitives (Gas)	Valves	386	0.00992	0%	3.82	16.75	0.90	3.93	0.01	0.04	5.2E-04	2.3E-03	0.01	0.05	0.01	0.06	3.82	16.75	96	419
		Pump Seals	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Other	45	0.01940	0%	0.87	3.82	0.20	0.90	2.1E-03	0.01	1.2E-04	5.2E-04	2.7E-03	0.01	3.4E-03	0.01	0.87	3.82	22	96
		Connectors	1,106	0.00044	0%	0.49	2.13	0.11	0.50	1.2E-03	0.01	6.6E-05	2.9E-04	1.5E-03	0.01	1.9E-03	0.01	0.49	2.13	12	53
		Flanges	180	0.00086	0%	0.15	0.68	0.04	0.16	3.7E-04	1.6E-03	2.1E-05	9.2E-05	4.8E-04	2.1E-03	6.0E-04	2.6E-03	0.15	0.68	4	17
		Open-ended	21	0.00441	0%	0.09	0.41	0.02	0.10	2.2E-04	9.8E-04	1.3E-05	5.5E-05	2.9E-04	1.3E-03	3.6E-04	1.6E-03	0.09	0.41	2	10
			1,737		**Subtotal:**	**5.43**	**23.79**	**1.27**	**5.58**	**0.01**	**0.06**	**7.4E-04**	**3.2E-03**	**0.02**	**0.07**	**0.02**	**0.09**	**5.43**	**23.79**	**136**	**595**

Unit ID	Description	Component (Unit) Type (Water/Oil)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC)		VOC 100.00 Wgt%		n-Hexane 10.00 Wgt%		BTEX, TMP-ea 3.00 Wgt%		Total HAP 25.00 Wgt%		CO2 0.20 Wgt%		CH4 30.00 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	lb/hr	tpy
FUG-W/2F	Process Piping Fugitives (Water/Oil)	Valves	193	0.00022	0%	0.04	0.18	0.04	0.18	4.2E-03	0.02	1.2E-03	0.01	0.01	0.05	8.3E-05	3.6E-04	0.01	0.05	0.31	1
		Pump Seals	2	0.00005	0%	1.1E-04	4.6E-04	1.1E-04	4.6E-04	1.1E-05	4.6E-05	3.2E-06	1.4E-05	2.6E-05	1.2E-04	2.1E-07	9.3E-07	3.2E-05	1.4E-04	7.9E-04	3.5E-03
		Other	23	0.03086	0%	0.69	3.04	0.69	3.04	0.07	0.30	0.02	0.09	0.17	0.76	1.4E-03	0.01	0.21	0.91	5	23
		Connectors	553	0.00024	0%	0.13	0.59	0.13	0.59	0.01	0.06	0.00	0.02	0.03	0.15	2.7E-04	0.00	0.04	0.18	1	4
		Flanges	90	0.00001	0%	5.8E-04	2.5E-03	5.8E-04	2.5E-03	5.8E-05	2.5E-04	1.7E-05	7.6E-05	1.4E-04	6.3E-04	1.2E-06	5.0E-06	1.7E-04	7.6E-04	4.3E-03	0.02
		Open-ended	11	0.00055	0%	0.01	0.03	0.01	0.03	5.8E-04	2.5E-03	1.7E-04	7.6E-04	1.4E-03	0.01	1.2E-05	5.1E-05	1.7E-03	7.6E-03	0.04	0.19
			871		**Subtotal:**	**0.88**	**3.84**	**0.88**	**3.84**	**0.09**	**0.38**	**0.03**	**0.12**	**0.22**	**0.96**	**0.00**	**0.01**	**0.26**	**1.15**	**7**	**29**
		TOTAL FUGITIVE EMISSIONS:				**6.31**	**27.63**	**2.15**	**9.42**	**0.10**	**0.44**	**0.03**	**0.12**	**0.24**	**1.03**	**0.02**	**0.10**	**5.70**	**24.95**	**142**	**624**

Notes:
1 - Assumed 8,760 hours per year of fugitive emissions.
2 - Gas and Water/Oil emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

TABLE 2.4 O&G PROD (AVE)	Gas		Water/Oil	
	kg/hr	lb/hr	kg/hr	lb/hr
Valves	4.5E-03	0.00992	9.8E-05	0.00022
Pump Seals	na	na	2.4E-05	0.00005
Others	8.8E-03	0.01940	1.4E-02	0.03086
Connectors	2.0E-04	0.00044	1.1E-04	0.00024
Flanges	3.9E-04	0.00086	2.9E-06	0.00001
Open-Ended Lines	2.0E-03	0.00441	2.5E-04	0.00055

3 - Component in Gas Service are based on GRI-HAPCalc estimates, plus a **50%** margin
4 - Component in Water/Oil Service are based on Gas Component count, times a **50%** reduction
5 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.
6 - To be conservative, the following gas and water/oil characteristics were assumed:

Pollutant	Gas		Water/Oil	
	Analysis	Estimated	Analysis	Estmated
Carbon Dioxide	0.29 Wgt%	0.39 Wgt%	--- Wgt%	0.20 Wgt%
Methane	67.21 Wgt%	100.00 Wgt%	--- Wgt%	30.00 Wgt%
VOC	19.47 Wgt%	23.44 Wgt%	--- Wgt%	100.00 Wgt%
n-Hexane	0.20 Wgt%	0.24 Wgt%	--- Wgt%	10.00 Wgt%
BTEX, TMP-ea	0.01 Wgt%	0.01 Wgt%	--- Wgt%	3.00 Wgt%
Total HAP	0.23 Wgt%	0.31 Wgt%	--- Wgt%	25.00 Wgt%

Potentially Applicable

AP-42 and GHG EMISSION FACTORS

(Preferentially use test data or vendor data where available)

	Pollutant	GAS-FIRED ENGINE AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			GAS-FIRED TURBINE 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)	3.170E+00	4.080E+00	2.210E+00	3.200E-01	1.300E-01	9.900E-02
	CO (≥ 90% Load)	3.860E-01	3.170E-01	3.720E+00	8.200E-02	3.000E-02	1.500E-02
	THC (TOC)	1.640E+00	1.470E+00	3.580E-01	1.100E-02	1.100E-02	1.100E-02
	NMHC (THC-CH4)	1.900E-01	2.200E-01	1.280E-01	2.400E-03	2.400E-03	2.400E-03
	NMNEHC (NMHC-C2H6)	1.191E-01	1.150E-01	5.760E-02	2.100E-03	2.100E-03	2.100E-03
	VOC	1.200E-01	1.180E-01	2.960E-02	2.100E-03	2.100E-03	2.100E-03
	SO2*** (2,000 gr-S/MMscf)	5.880E-04	5.880E-04	5.880E-04	3.400E-03	3.400E-03	3.400E-03
	PM10/2.5 (Filter+Cond)	4.831E-02	9.987E-03	1.941E-02	6.600E-03	6.600E-03	6.600E-03
HAPs	Benzene	1.940E-03	4.400E-04	1.580E-03	1.200E-05	1.200E-05	9.100E-07
	Ethylbenzene	1.080E-04	3.970E-05	2.480E-05	3.200E-05	3.200E-05	3.200E-05
	Formaldehyde (HCHO)	5.520E-02	5.280E-02	2.050E-02	7.100E-04	7.100E-04	2.000E-05
	n-Hexane	4.450E-04	1.110E-03	---	---	---	---
	Methanol (MeOH)	2.480E-03	2.500E-03	3.060E-03	---	---	---
	Toluene	9.630E-04	4.080E-04	5.580E-04	1.300E-04	1.300E-04	1.300E-04
	TMP, 2,2,4- (i-Octane)	8.460E-04	2.500E-04	---	---	---	---
	Xylenes	2.680E-04	1.840E-04	1.950E-04	6.400E-05	6.400E-05	6.400E-05
	Other HAPs	1.715E-02	1.443E-02	6.359E-03	1.061E-04	1.061E-04	1.061E-04
GHG	CO2**** (GWP=1)	1.170E+02	1.170E+02	1.170E+02	1.170E+02	1.170E+02	1.170E+02
	CH4 (GWP=25)	1.450E+00	1.250E+00	2.300E-01	8.600E-03	8.600E-03	8.600E-03
	N2O (GWP=298)	*2.205E-04*	*2.205E-04*	*2.205E-04*	3.000E-03	3.000E-03	3.000E-03
	CO2e	*1.533E+02*	*1.483E+02*	*1.228E+02*	*1.181E+02*	*1.181E+02*	*1.181E+02*

(#Lean Pre-Mix - aka: Dry Low Emissions (DLE or DLN) and SoLoNOx)

	Pollutant	GAS-FIRED EXTERNAL COMBUSTION AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			FLARE 13.5-1 04/15	DIESEL ENGINE 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	9.804E-02	4.902E-02	3.137E-02	6.800E-02	4.410E+00
	CO	8.235E-02	8.235E-02	8.235E-02	3.100E-01	9.500E-01
	THC (TOC)	1.078E-02	1.078E-02	1.078E-02	≥98% Destruction and Removal Efficiency	3.600E-01
	NMHC (THC-CH4)	8.529E-03	8.529E-03	8.529E-03		3.534E-01
	NMNEHC (NMHC-C2H6)	5.490E-03	5.490E-03	5.490E-03		3.503E-01
	VOC (NMNEHC+HCHO)	5.564E-03	5.564E-03	5.564E-03		3.600E-01
	SO2 (2,000 gr-S/MMscf)	5.882E-04	5.882E-04	5.882E-04	*5.882E-04*	2.900E-01
	PM10/2.5 (Filter+Condense)	7.451E-03	7.451E-03	7.451E-03	*7.451E-03*	3.100E-01
HAPs	Benzene	2.059E-06	2.059E-06	2.059E-06	≥98% Destruction and Removal Efficiency	9.330E-04
	Ethylbenzene	---	---	---		---
	HCHO (Formaldehyde)	7.353E-05	7.353E-05	7.353E-05		1.180E-03
	n-Hexane	1.765E-03	1.765E-03	1.765E-03		---
	Methanol (MeOH)	---	---	---		---
	Toluene	3.333E-06	3.333E-06	3.333E-06		4.090E-04
	2,2,4-TMP (i-Octane)	---	---	---		---
	Xylenes	---	---	---		2.850E-04
	Other HAPs	1.861E-06	1.861E-06	1.861E-06		1.050E-03
GHG	CO2 (GWP=1)	1.176E+02	1.176E+02	1.176E+02	*1.176E+02*	1.640E+02
	CH4 (GWP=25)	2.255E-03	2.255E-03	2.255E-03	*98% DRE*	*6.614E-03*
	N2O (GWP=298)	2.157E-03	6.275E-04	6.275E-04	*2.157E-03*	*1.323E-03*
	CO2e	*1.183E+02*	*1.179E+02*	*1.179E+02*	*1.183E+02*	*1.646E+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	163.054	6.614E-03	1.323E-03
Propane	0.091 MMBtu/gal	138.605	6.614E-03	1.323E-03
Natural Gas	1,026 Btu/scf	116.977	2.205E-03	2.205E-04

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

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 ^{o}F	=	(^{o}C*9/5)+32
1.0 ^{o}R	=	^{o}F+459.67
1.0 %	=	10,000 ppm
UGC (stp)	=	379.48 scf/lb-mol

*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.

GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: Neehouse - 5.0 MMscfd Dehy-01 w.o Flash Tank
File Name: C:\projects2\wfs\OVM\Neehouse\R13 Application\temp\00 - ATT-Lb - Neehouse - NSR-Mod - 5.0 Dehy - GRI-GLYCalc - 07.20.15.ddf
Date: July 20, 2015

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	27.2737	654.570	119.4590
Ethane	9.4081	225.795	41.2076
Propane	3.7369	89.685	16.3675
Isobutane	0.7042	16.901	3.0843
n-Butane	1.2555	30.131	5.4989
Isopentane	0.4215	10.116	1.8462
n-Pentane	0.3620	8.688	1.5856
Cyclopentane	0.0007	0.017	0.0031
n-Hexane	0.1824	4.377	0.7989
Cyclohexane	0.1647	3.953	0.7214
Other Hexanes	0.3041	7.298	1.3319
Heptanes	0.3804	9.130	1.6663
Methylcyclohexane	0.0091	0.217	0.0397
2,2,4-Trimethylpentane	0.0008	0.020	0.0037
Benzene	0.1068	2.563	0.4678
Toluene	0.4755	11.412	2.0827
Ethylbenzene	0.0209	0.501	0.0914
Xylenes	0.5312	12.750	2.3268
C8+ Heavies	0.2694	6.466	1.1801
Total Emissions	45.6080	1094.591	199.7629
Total Hydrocarbon Emissions	45.6080	1094.591	199.7629
Total VOC Emissions	8.9261	214.226	39.0963
Total HAP Emissions	1.3176	31.623	5.7713
Total BTEX Emissions	1.1344	27.226	4.9687

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Neehouse - 5.0 MMscfd Dehy-01 w.o Flash Tank
File Name: C:\projects2\wfs\OVM\Neehouse\R13 Application\temp\00 - ATT-Lb - Neehouse - NSR-Mod - 5.0 Dehy - GRI-GLYCalc - 07.20.15.ddf
Date: July 20, 2015

DESCRIPTION:

Description: Wet Gas: 60oF, 1,100 psig
Glycol Pump: Kimray 9015 PV, 1.5 gpm
No Flash Tank
No Condenser
No Flare

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 60.00 deg. F
Pressure: 1100.00 psig
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1303
Nitrogen	0.3611
Methane	82.0816
Ethane	12.6882
Propane	3.1285
Isobutane	0.4060
n-Butane	0.6440
Isopentane	0.1808
n-Pentane	0.1363
Cyclopentane	0.0001
n-Hexane	0.0455
Cyclohexane	0.0126
Other Hexanes	0.0885
Heptanes	0.0569
Methylcyclohexane	0.0006
2,2,4-Trimethylpentane	0.0002
Benzene	0.0010
Toluene	0.0029
Ethylbenzene	0.0001
Xylenes	0.0020
C8+ Heavies	0.0324

DRY GAS:

Flow Rate: 5.0 MMSCF/day
Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

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

PUMP:

Glycol Pump Type: Gas Injection
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Neehouse - 5.0 MMscfd Dehy-01 w.o Flash Tank
File Name: C:\projects2\wfs\OVM\Neehouse\R13 Application\temp\00 - ATT-Lb - Neehouse - NSR-Mod - 5.0 Dehy - GRI-GLYCalc - 07.20.15.ddf
Date: July 20, 2015

DESCRIPTION:

Description: Wet Gas: 60oF, 1,100 psig
Glycol Pump: Kimray 9015 PV, 1.5 gpm
No Flash Tank
No Condenser
No Flare

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	27.2737	654.570	119.4590
Ethane	9.4081	225.795	41.2076
Propane	3.7369	89.685	16.3675
Isobutane	0.7042	16.901	3.0843
n-Butane	1.2555	30.131	5.4989
Isopentane	0.4215	10.116	1.8462
n-Pentane	0.3620	8.688	1.5856
Cyclopentane	0.0007	0.017	0.0031
n-Hexane	0.1824	4.377	0.7989
Cyclohexane	0.1647	3.953	0.7214
Other Hexanes	0.3041	7.298	1.3319
Heptanes	0.3804	9.130	1.6663
Methylcyclohexane	0.0091	0.217	0.0397
2,2,4-Trimethylpentane	0.0008	0.020	0.0037
Benzene	0.1068	2.563	0.4678
Toluene	0.4755	11.412	2.0827
Ethylbenzene	0.0209	0.501	0.0914
Xylenes	0.5312	12.750	2.3268
C8+ Heavies	0.2694	6.466	1.1801
Total Emissions	45.6080	1094.591	199.7629
Total Hydrocarbon Emissions	45.6080	1094.591	199.7629
Total VOC Emissions	8.9261	214.226	39.0963
Total HAP Emissions	1.3176	31.623	5.7713
Total BTEX Emissions	1.1344	27.226	4.9687

EQUIPMENT REPORTS:

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:	0.51	lbs. H2O/MMSCF
Temperature:	60.0	deg. F
Pressure:	1100.0	psig
Dry Gas Flow Rate:	5.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.0331	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	16.04	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	27.81	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.19%	96.81%
Carbon Dioxide	99.40%	0.60%
Nitrogen	99.95%	0.05%
Methane	99.96%	0.04%
Ethane	99.89%	0.11%
Propane	99.85%	0.15%
Isobutane	99.80%	0.20%
n-Butane	99.73%	0.27%
Isopentane	99.75%	0.25%
n-Pentane	99.67%	0.33%
Cyclopentane	98.49%	1.51%
n-Hexane	99.49%	0.51%
Cyclohexane	97.51%	2.49%
Other Hexanes	99.61%	0.39%
Heptanes	99.13%	0.87%
Methylcyclohexane	97.54%	2.46%
2,2,4-Trimethylpentane	99.67%	0.33%
Benzene	75.45%	24.55%
Toluene	67.96%	32.04%
Ethylbenzene	64.57%	35.43%
Xylenes	54.85%	45.15%
C8+ Heavies	99.45%	0.55%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	79.58%	20.42%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.21%	99.79%
n-Pentane	0.25%	99.75%
Cyclopentane	0.41%	99.59%
n-Hexane	0.30%	99.70%
Cyclohexane	2.83%	97.17%

Other Hexanes	0.53%	99.47%
Heptanes	0.36%	99.64%
Methylcyclohexane	3.53%	96.47%
2,2,4-Trimethylpentane	0.74%	99.26%
Benzene	4.93%	95.07%
Toluene	7.80%	92.20%
Ethylbenzene	10.26%	89.74%
Xylenes	12.73%	87.27%
C8+ Heavies	7.71%	92.29%

STREAM REPORTS:

WET GAS STREAM

Temperature: 60.00 deg. F
Pressure: 1114.70 psia
Flow Rate: 2.09e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	3.38e-002	3.34e+000
Carbon Dioxide	1.30e-001	3.15e+001
Nitrogen	3.61e-001	5.56e+001
Methane	8.21e+001	7.23e+003
Ethane	1.27e+001	2.10e+003
Propane	3.13e+000	7.58e+002
Isobutane	4.06e-001	1.30e+002
n-Butane	6.44e-001	2.06e+002
Isopentane	1.81e-001	7.17e+001
n-Pentane	1.36e-001	5.40e+001
Cyclopentane	1.00e-004	3.85e-002
n-Hexane	4.55e-002	2.15e+001
Cyclohexane	1.26e-002	5.83e+000
Other Hexanes	8.85e-002	4.19e+001
Heptanes	5.69e-002	3.13e+001
Methylcyclohexane	6.00e-004	3.24e-001
2,2,4-Trimethylpentane	2.00e-004	1.26e-001
Benzene	1.00e-003	4.29e-001
Toluene	2.90e-003	1.47e+000
Ethylbenzene	1.00e-004	5.83e-002
Xylenes	2.00e-003	1.17e+000
C8+ Heavies	3.24e-002	3.03e+001
Total Components	100.00	1.08e+004

DRY GAS STREAM

Temperature: 60.00 deg. F
Pressure: 1114.70 psia
Flow Rate: 2.08e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.08e-003	1.07e-001

Carbon Dioxide	1.30e-001	3.13e+001
Nitrogen	3.61e-001	5.55e+001
Methane	8.21e+001	7.23e+003
Ethane	1.27e+001	2.09e+003
Propane	3.13e+000	7.57e+002
Isobutane	4.05e-001	1.29e+002
n-Butane	6.43e-001	2.05e+002
Isopentane	1.80e-001	7.15e+001
n-Pentane	1.36e-001	5.38e+001
Cyclopentane	9.85e-005	3.79e-002
n-Hexane	4.53e-002	2.14e+001
Cyclohexane	1.23e-002	5.68e+000
Other Hexanes	8.82e-002	4.17e+001
Heptanes	5.64e-002	3.11e+001
Methylcyclohexane	5.86e-004	3.16e-001
2,2,4-Trimethylpentane	1.99e-004	1.25e-001
Benzene	7.55e-004	3.24e-001
Toluene	1.97e-003	9.98e-001
Ethylbenzene	6.46e-005	3.77e-002
Xylenes	1.10e-003	6.40e-001
C8+ Heavies	3.22e-002	3.02e+001
Total Components	100.00	1.08e+004

LEAN GLYCOL STREAM

Temperature: 60.00 deg. F
Flow Rate: 1.50e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.31e+002
Water	1.50e+000	1.27e+001
Carbon Dioxide	2.25e-012	1.90e-011
Nitrogen	2.98e-013	2.52e-012
Methane	1.05e-017	8.83e-017
Ethane	1.27e-007	1.07e-006
Propane	5.56e-009	4.69e-008
Isobutane	9.32e-010	7.87e-009
n-Butane	1.63e-009	1.37e-008
Isopentane	1.05e-004	8.91e-004
n-Pentane	1.06e-004	8.93e-004
Cyclopentane	3.46e-007	2.92e-006
n-Hexane	6.48e-005	5.47e-004
Cyclohexane	5.67e-004	4.79e-003
Other Hexanes	1.93e-004	1.63e-003
Heptanes	1.63e-004	1.37e-003
Methylcyclohexane	3.93e-005	3.32e-004
2,2,4-Trimethylpentane	7.38e-007	6.23e-006
Benzene	6.56e-004	5.54e-003
Toluene	4.77e-003	4.02e-002
Ethylbenzene	2.83e-004	2.39e-003
Xylenes	9.17e-003	7.75e-002
C8+ Heavies	2.67e-003	2.25e-002
Total Components	100.00	8.44e+002

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 60.00 deg. F
Pressure: 1114.70 psia
Flow Rate: 1.61e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.30e+001	8.31e+002
Water	1.78e+000	1.59e+001
Carbon Dioxide	3.32e-002	2.97e-001
Nitrogen	2.40e-002	2.15e-001
Methane	3.05e+000	2.73e+001
Ethane	1.05e+000	9.41e+000
Propane	4.18e-001	3.74e+000
Isobutane	7.88e-002	7.04e-001
n-Butane	1.40e-001	1.26e+000
Isopentane	4.73e-002	4.22e-001
n-Pentane	4.06e-002	3.63e-001
Cyclopentane	8.02e-005	7.17e-004
n-Hexane	2.05e-002	1.83e-001
Cyclohexane	1.90e-002	1.69e-001
Other Hexanes	3.42e-002	3.06e-001
Heptanes	4.27e-002	3.82e-001
Methylcyclohexane	1.05e-003	9.38e-003
2,2,4-Trimethylpentane	9.43e-005	8.43e-004
Benzene	1.26e-002	1.12e-001
Toluene	5.77e-002	5.16e-001
Ethylbenzene	2.60e-003	2.33e-002
Xylenes	6.81e-002	6.09e-001
C8+ Heavies	3.27e-002	2.92e-001
Total Components	100.00	8.94e+002

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 8.96e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.64e+000	3.25e+000
Carbon Dioxide	2.86e-001	2.97e-001
Nitrogen	3.25e-001	2.15e-001
Methane	7.20e+001	2.73e+001
Ethane	1.32e+001	9.41e+000
Propane	3.59e+000	3.74e+000
Isobutane	5.13e-001	7.04e-001
n-Butane	9.14e-001	1.26e+000
Isopentane	2.47e-001	4.22e-001
n-Pentane	2.12e-001	3.62e-001
Cyclopentane	4.31e-004	7.14e-004
n-Hexane	8.96e-002	1.82e-001
Cyclohexane	8.28e-002	1.65e-001
Other Hexanes	1.49e-001	3.04e-001
Heptanes	1.61e-001	3.80e-001
Methylcyclohexane	3.90e-003	9.05e-003

2,2,4-Trimethylpentane	3.10e-004	8.37e-004
Benzene	5.79e-002	1.07e-001
Toluene	2.18e-001	4.76e-001
Ethylbenzene	8.32e-003	2.09e-002
Xylenes	2.12e-001	5.31e-001
C8+ Heavies	6.70e-002	2.69e-001
Total Components	100.00	4.94e+001

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

"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."

- **Monitoring/Recordkeeping/Reporting/Testing Plans**
  A. Monitoring
  B. Recordkeeping
  C. Reporting
  D. Testing

Attachment O
MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

Williams Ohio Valley Midstream LLC proposes the following monitoring, recordkeeping, testing and reporting requirements at the subject facility:

A. Monitoring

1. Monitor and record quantity of natural gas combusted in the engine.
2. Monitor and record quantity of natural gas treated in the dehydrator.
3. Monitor and record quantity of produced water transferred from the storage tank.
4. Use data collected above as input into GRI-GLYCalc Model to determine actual and potential VOC and HAP emissions on yearly basis.

B. Recordkeeping

1. Maintain records of the amount of natural gas consumed and hours of operation for the engine.
2. Maintain records of the amount of natural gas treated in the dehydrator.
3. Maintain records demonstrating the actual annual average volume of natural gas treated in the dehydrator is less than 3 MMscfd OR the actual annual average benzene emissions are less than one ton per year.
4. Maintain records of the amount of produced water transferred from the storage tank.
5. 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.
6. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engine, dehydration unit and ancillary equipment.
7. The records shall be maintained on site or in a readily available off-site location for a period of five (5) years.

C. Reporting

1. Any deviations from the allowable emissions limitations, including visible emissions.
2. Any and all application forms, reports, or compliance certifications required by this Permit shall be certified by a responsible official.

D. Testing

Not Applicable (except for annual extended gas analysis described above).

ATTACHMENT P

Public Notice

"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).

- 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.

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 a existing (currently exempt) natural gas compressor station located approximately 0.4 mi N-NE of 236 Wolf Run Rd, Cameron,Marshall County, WV 26033.

The latitude and longitude coordinates are 39.9188° North and -80.5738° West.

The applicant estimates the potential to discharge regulated air pollutants will be as follows:

3.96	tons of nitrogen oxides per year
3.95	tons of carbon monoxide per year
62.00	tons of volatile organic compounds per year
0.01	tons of sulfur dioxide per year
0.16	tons of particulate matter per year
0.70	tons of benzene per year
0.24	tons of ethylbenzene per year
0.25	tons of formaldehyde per year
1.45	tons of n-hexane per year
0.01	tons of methanol per year
2.64	tons of toluene per year
0.14	tons of 2,2,4-trimethylpentane per year
2.93	tons of xylenes per year
0.03	tons of other hazardous air plolutants per year
8.39	tons of total hazardous air pollutants per year
12,018	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 _____, 2015.

By: Mr. Don Wicburg, Vice President and General Manager
Williams Ohio Valley Midstream LLC
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)

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also

ATTACHMENT S

Title V Permit Revision Information

(NOT APPLICABLE)

APPLICATION FEE

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: $1,000 Not Applicable
  - NESHAP Requirements: **$2,500** **Applicable (Subpart HH)**
- Total application fee is **$3,500** [= $1,000 minimum fee + $2,500 additional charges]

******* End of Application for 45CSR13 NSR Permit ******

WILLIAMS FIELD SERVICES GROUP, INC
PO BOX 21218
TULSA, OK 74121-1218

COMPANY NUMBER: 4000

CHECK NUMBER: 4000115074

PAY DATE	SUPPLIER NO.	SUPPLIER NAME	CHECK TOTAL
24-JUL-15	526257	WV DEP - DIVISION OF AIR QUALITY	3,500.00

Invoice Date	Invoice Or Credit Memo / Invoice Description	Gross	Discount	Net
22-JUL-15	22-JUL-2015 / AIR PEMRIT APPLICATION FEE FOR NEEH	3,500.00	0.00	3,500.00
		Page Totals	0.00	3,500.00

Supplier Support 1-866-778-2665

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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: 4000115074
Check Date: 24-JUL-15

Three 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)	$3,500.00

Authorized Signature

⑈4000115074⑈ ⑆071923226⑆ 0094011687⑈

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