



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

May 18, 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

**Subject: Application for 45CSR13 NSR Modification Permit
Williams Ohio Valley Midstream LLC
STARCOVIC 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 to modify the existing Starcovic Compressor Station (facility) located near Cameron in Marshall County, West Virginia.

This application for 45CSR13 NSR Modification Permit has been prepared and submitted to update the existing permit (G35-A051) to reflect actual construction and operations, as follows:

- Remove one of the permitted Ajax DPC-2802 compressor engines;
- Remove one of the permitted 10 MMscfd TEG dehydrators;
- Modify the existing 10 MMscfd TEG dehydrator operating parameters;
- Include Rod Packing and Crankcase Emissions;
- Include Light Liquid Fugitive Emissions;
- Update Extended Gas Analysis; and
- Update emission factors and other emission estimating protocols

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.

Beverly McKeone
WVDEP – Division of Air Quality
May 18, 2015
Page 2 of 2

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, PE
Environmental Specialist

Enclosures:

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

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

For the:

**Williams Ohio Valley Midstream LLC
STARCOVIC 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
100 Teletech Drive, Suite 2
Moundsville, WV 26041**

Prepared by:



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

May 2015

APPLICATION FOR 45CSR13 NSR MODIFICATION PERMIT

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

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APPLICATION FEE

**APPLICATION FOR
45CSR13 NSR
MODIFICATION PERMIT**

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



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 (304) 926-0475
www.dep.wv.gov/daq

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

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):
 CONSTRUCTION MODIFICATION RELOCATION
 CLASS I ADMINISTRATIVE UPDATE TEMPORARY
 CLASS II ADMINISTRATIVE UPDATE AFTER-THE-FACT

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):
 ADMINISTRATIVE AMENDMENT MINOR MODIFICATION
 SIGNIFICANT MODIFICATION
 IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office): WILLIAMS OHIO VALLEY MIDSTREAM LLC		2. Federal Employer ID No. (FEIN): 27-0856707	
3. Name of facility (if different from above): STARCOVIC COMPRESSOR STATION		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: PARK PLACE CORPORATE CENTER 2 2000 COMMERCE DRIVE PITTSBURGH, PA 15275		5B. Facility's present physical address: CAMERON, WV 26033	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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.): NATURAL GAS PRODUCTION FACILITY		10. North American Industry Classification System (NAICS) code for the facility: 213112 – SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS	
11A. DAQ Plant ID No. (for existing facilities only): 051-00137		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): G35-A051	

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

<p>12A.</p> <ul style="list-style-type: none"> For Modifications, Administrative Updates or Temporary permits at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; For Construction or Relocation permits, please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a MAP as Attachment B. FROM US ROUTE 250 IN CAMERON TURN WEST ON CR-25 (MAIN ST.). FOLLOW APPROXIMATELY 1 MILE AND STAY RIGHT TO STAY ON CR-25. FOLLOW APPROXIMATELY 0.7 MILES TO ACCESS ROAD. 		
12.B. New site address (if applicable): na	12C. Nearest city or town: CAMERON	12D. County: MARSHALL
12.E. UTM Northing (KM): 4,409.279	12F. UTM Easting (KM): 535.609	12G. UTM Zone: 17
<p>13. Briefly describe the proposed change(s) at the facility:</p> <ul style="list-style-type: none"> Remove one of the permitted Ajax DPC-2802 compressor engines; Remove one of the permitted 10 MMscfd TEG dehydrators; Modify the existing 10 MMscfd TEG dehydrator operating parameters; Include Rod Packing and Crankcase Emissions; Include Light Liquid Fugitive Emissions; Update Extended Gas Analysis; and Update emission factors and other emission estimating protocols 		
<p>14A. Provide the date of anticipated installation or change: Upon Permit Issuance</p> <ul style="list-style-type: none"> If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: NA 		<p>14B. Date of anticipated Start-Up if a permit is granted: Upon Permit Issuance</p>
<p>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).</p>		
<p>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</p>		
<p>16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p>		
<p>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.</p>		
<p>18. Regulatory Discussion. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<i>if known</i>). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (<i>if known</i>). Provide this information as Attachment D.</p>		

Section II. Additional attachments and supporting documents.

<p>19. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).</p>
<p>20. Include a Table of Contents as the first page of your application package.</p>
<p>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).</p> <ul style="list-style-type: none"> Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).
<p>22. Provide a Detailed Process Flow Diagram(s) showing each proposed or modified emissions unit, emission point and control device as Attachment F.</p>
<p>23. Provide a Process Description as Attachment G.</p> <ul style="list-style-type: none"> Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).
<p>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</p>

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H**.
 – For chemical processes, provide a MSDS for each compound emitted to the air.

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

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

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

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

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

General Emission Unit, specify:
NATURAL GAS FIRED COMPRESSOR ENGINE AND DEHYDRATION UNIT

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

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

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

Other Collectors, specify :

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

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

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

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

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

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?
 YES NO

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

Section III. Certification of Information

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

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

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

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

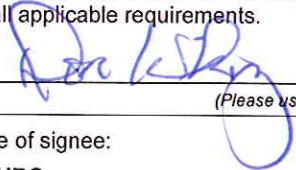
35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE 
(Please use blue ink)

DATE: 5/15/2015
(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 (if different from above): R. DANELL ZAWASKI, PE		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:

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

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

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

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

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

ATTACHMENT A

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

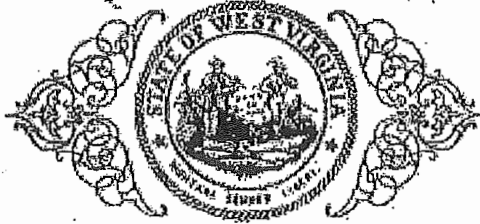


*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
May 15, 2012*

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

Location/Topographic Map

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

- **Address:**
 - ~0.2 Miles North of State Route 25
 - ~1.0 Miles East-Northeast of Cameron
 - Cameron, Marshall County, WV 26033

 - **Latitude and Longitude:**
 - 39°49'58.1" North x -80°35'1.7" West
 - (39.8328° North x -80.5838° West)

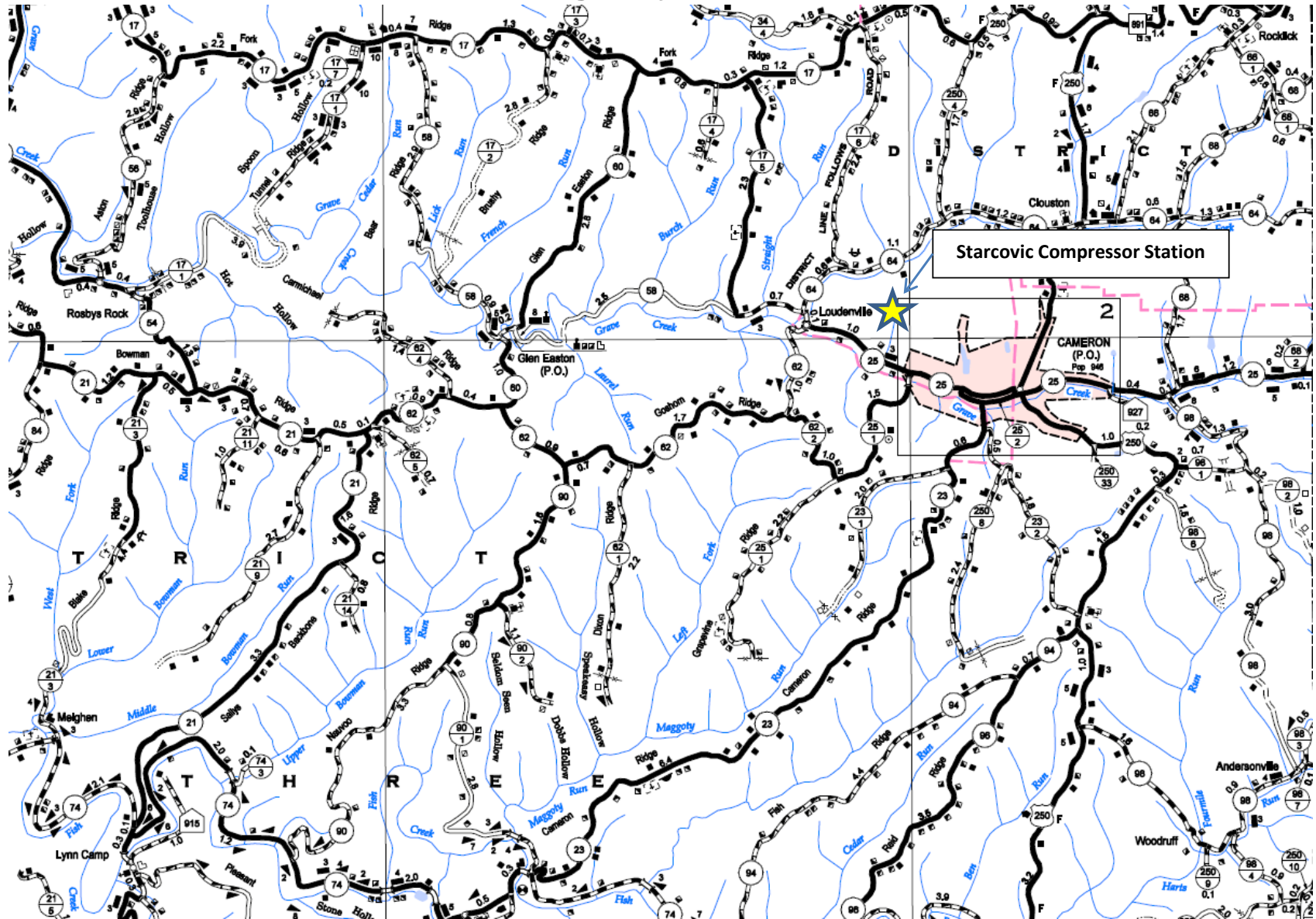
 - **UTM:**
 - 535.6 km Easting x 4,409.3 km Northing x Zone 17S

 - **Elevation:**
 - ~1,170'

 - **Directions:**
 - From U.S. Route 250 in Cameron:
 - a. Turn west on CR-25 (Main Street)
 - b. Travel on CR-25 ~1.0 Mi;
-

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
Application for 45CSR13 NSR Permit

Highway 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 Starcovic Compressor Station is an existing operation. This application is prepared and submitted to update the existing permit to reflect actual construction and operations, as follows:

- Remove one of the permitted Ajax DPC-2802 compressor engines;
 - Remove one of the permitted 10 MMscfd TEG dehydrators;
 - Modify the existing 10 MMscfd TEG dehydrator operating parameters;
 - Include Rod Packing and Crankcase Emissions;
 - Include Light Liquid Fugitive Emissions;
 - Update Extended Gas Analysis; and
 - Update emission factors and other emission estimating protocols
-

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
STARCOVIC COMPRESSOR STATION
Application for 45CSR13 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
- PM_{10/2.5}: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- CO_{2e}: PSD Natural Minor Source with Pre-Controlled PTE < 100,000 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
- PM_{10/2.5}: 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 to any sources at the subject facility.

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, 471.79 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 400 bhp Ajax DPC-2802LE compressor engine (CE-1) because its maximum engine power is less than 500 HP and it was manufactured before 07/01/08.
- 9. NSPS KKKK, Stationary Combustion Turbines**
40CFR§60.4300-§60.4420 [Not Applicable]
- This rule does not apply because there is no stationary combustion turbine at the facility (§60.4300).
- 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 prior to 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 400 bhp Ajax DPC-2802LE compressor Engine (CE-1) and the 17 MMscfd TEG Dehydrator (RSV-1) because they are subject to NESHAP Subparts ZZZZ and HH. Requirements include notification, monitoring and recordkeeping.
- 12. NESHAP HH, Oil and Natural Gas Production Facilities**
40CFR§63.760-§63.779 [Applicable]
- This rule does apply to the 17 MMscfd TEG Dehydrator (RSV-1). However, because the TEG dehydrator has a benzene PTE < 0.90 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 400 bhp Ajax DPC-2802LE (2SLB) engine because it is an “existing” RICE; i.e., commenced construction before 06/12/06 (§63.6590(a)(1)(iii)). Requirements include work practice standards and recordkeeping.

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 – 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, a control device is not used to achieve compliance and 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 Starcovic Compressor Station is the Keaton Compression Station, which is located 1.5 miles away. The Starcovic Compressor Station does not meet the common sense definition of being "contiguous" with or "adjacent" to the Keaton Compressor Station.

The Starcovic 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 and is located less than ½ mile from that wellpad.

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 Keaton Compressor Station, located approximately 1.5 miles away. This facility is the closest to Starcovic to have common ownership but it is not “contiguous” with or “adjacent” to the Starcovic 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 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 has received a 45CSR13 Permit for the subject facility 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 neither a new major source of pollutants nor is the proposed modification a modification to an existing major source.

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 Standards (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 Subparts HH and ZZZZ of 40 CFR Part 63 which apply to non-major area sources of hazardous air pollutants are excluded.

ATTACHMENT E

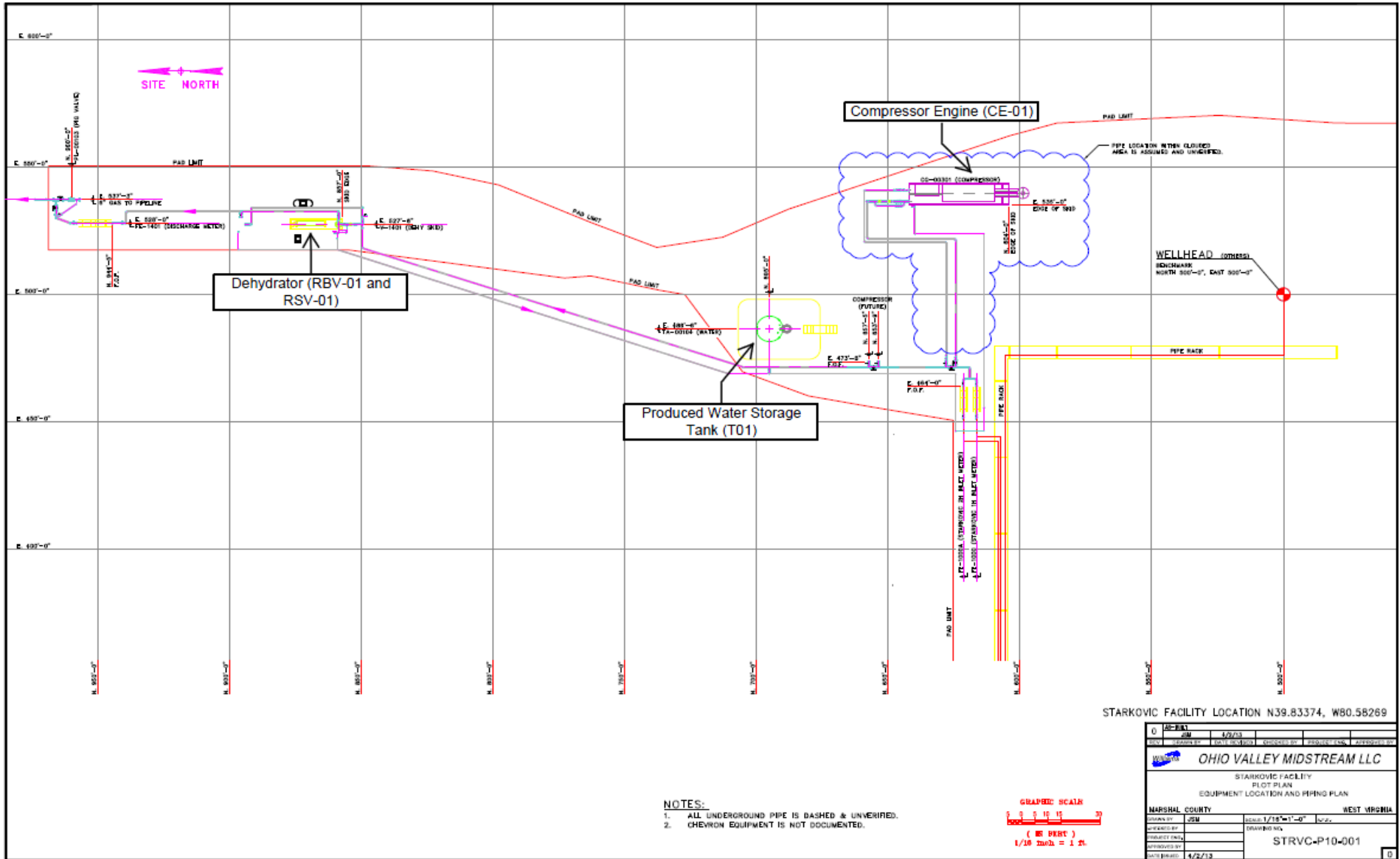
Plot Plan

“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**
-

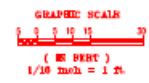
Williams Ohio Valley Midstream LLC (OVM)
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Permit

ATTACHMENT E - Plot Plan



STARCOVIC FACILITY LOCATION N39.83374, W80.58269

- NOTES:**
1. ALL UNDERGROUND PIPE IS DASHED & UNVERIFIED.
 2. CHEVRON EQUIPMENT IS NOT DOCUMENTED.



0		DATE: 4/2/13	
DRAWN BY: JSM		CHECKED BY: JSM	
OHIO VALLEY MIDSTREAM LLC			
STARCOVIC FACILITY PLOT PLAN EQUIPMENT LOCATION AND PIPING PLAN			
MARSHAL COUNTY		WEST VIRGINIA	
DRAWN BY: JSM	SCALE: 1/16"=1'-0"	DRAWING NO. STRVC-P10-001	
APPROVED BY:	DATE: 4/2/13		

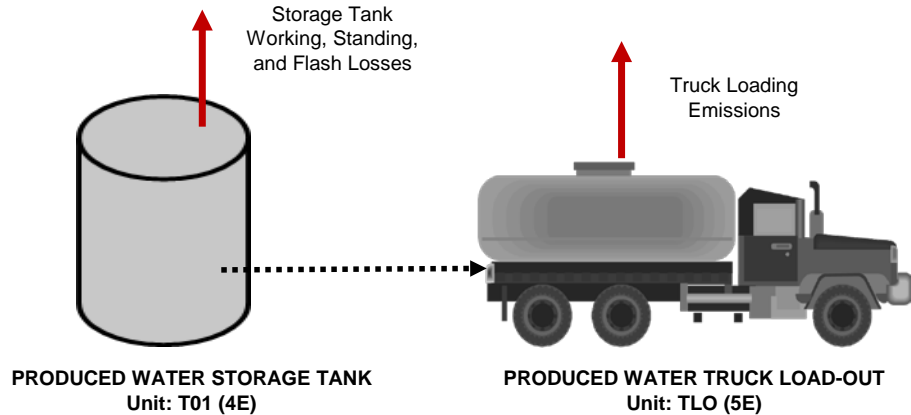
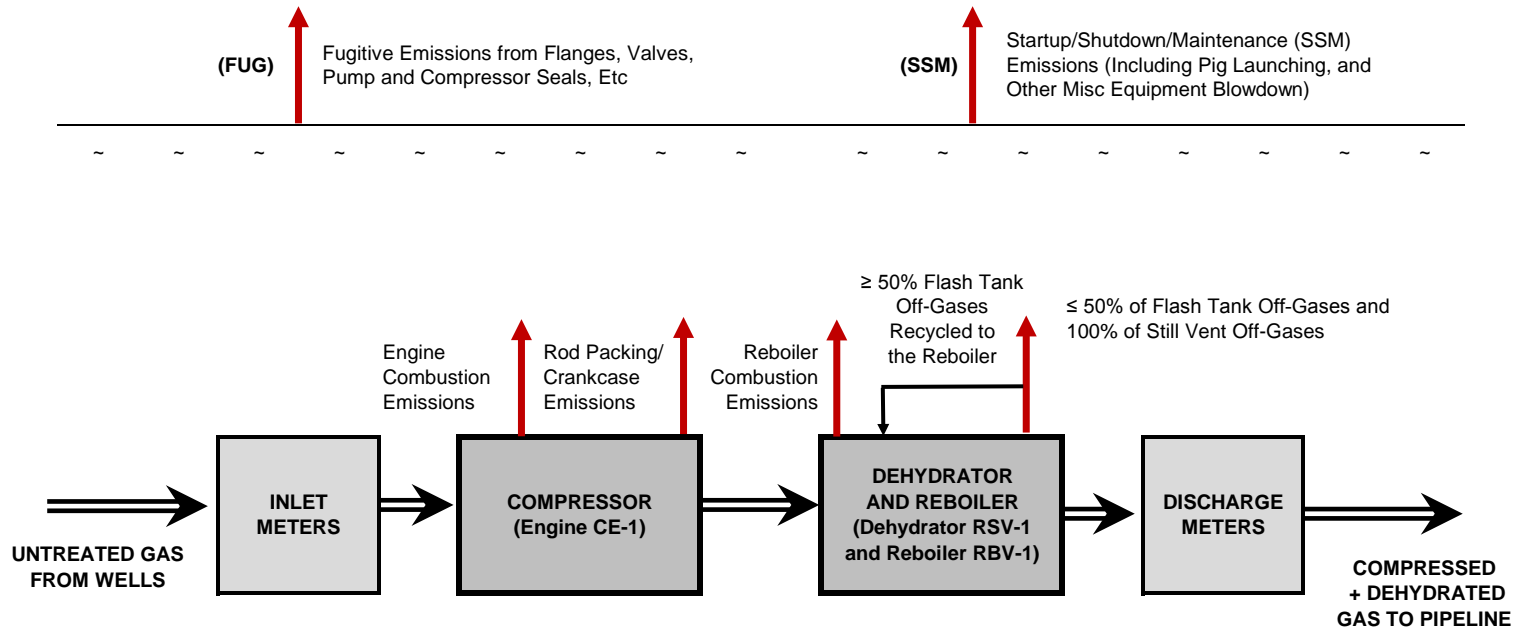
ATTACHMENT F

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)**
-

Attachment F - Process Flow Diagram (PFD)



<u>ID No.</u>	<u>Company ID</u>	<u>Description</u>
CE-1 (1E)	Engine 01	400 bhp Ajax DPC-2802LE Engine
RSV-1 (2E)	Dehy 01	17 MMscfd Dehydrator
RBV-1 (3E)	Reboiler 01	0.375 MMBtu/hr Reboiler
T01 (4E)	Tank 01	210 bbl Produced Water Tank
TLO (5E)	TLO	Truck Load-Out
SSM (6E)	SSM	Startup/Shutdown/Maintenance (w/ Blowdown)
RPC (7E)	RPC	Rod Packing/Crankcase Emissions
FUG (1F, 2F)	Fugitives	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. Triethylene Glycol (TEG) Dehydrator
 - D. Triethylene Glycol (TEG) Reboiler
 - E. Storage Tanks
 - F. Truck Load-Out
 - G. Startup/Shutdown/Maintenance
 - H. Compressor Rod Packing and Crankcase Emissions
 - I. Piping and Equipment Fugitive Emissions
-

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

Attachment G
PROCESS DESCRIPTION

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the existing Starcovic Compressor Station located off State Route 25 approximately 1 mile ENE of Cameron 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 to update the existing permit to reflect actual construction and operations, as follows:

- Remove one (1) permitted 400 bhp Ajax DPC-2802LE compressor engine;
- Remove one (1) permitted 10 MMscfd TEG dehydrator;
- Modify the existing 10 MMscfd TEG dehydrator operating parameters;
- Include Rod Packing and Crankcase Emissions;
- Include Light Liquid Fugitive Emissions;
- Update Extended Gas Analysis; and
- Update emission factors and other emission estimating protocols

B. Compressor Engine

One (1) natural gas-fueled compressor engine is utilized at the facility. The lean-burn engine (CE-01) drives a natural gas compressor to increase the pressure of the natural gas. Emissions result from the combustion of natural gas fuel.

C. 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), a Flash Tank, 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 routed to a flash tank where the glycol pressure is reduced to liberate the lighter end hydrocarbons (especially methane). Whenever practical, the lighter end hydrocarbons are routed from the flash tank to the Reboiler for use as fuel; otherwise these off-gases are vented to the atmosphere.

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

D. Tri-Ethylene Glycol (TEG) Reboiler

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

E. Storage Tanks

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

The produced water 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 (T01). 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 Starcovic 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, blanket gas may be used on the produced water tank to prevent air from entering the tank and potentially causing an explosion.

F. 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 (TLO).

G. 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.

H. 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.

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**
 - Natural Gas Composition
 - Extended Gas Analysis

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

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
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Attachment H

INLET GAS COMPOSITION - SUMMARY

Representative Inlet Gas Composition (Starcovic Master - 07-11-2014)

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#)
Nitrogen	7727-37-9	N2	28.013	0.7378	0.007378	0.2067	1.0586	544.66
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	0.2241	0.002241	0.0986	0.5052	259.90
Methane*	75-82-8	CH4	16.042	81.9672	0.819693	13.1499	67.3512	34,652.23
Ethane*	74-84-0	C2H6	30.069	12.6209	0.126212	3.7951	19.4377	10,000.69
Propane**	74-98-6	C3H8	44.096	3.0055	0.030056	1.3253	6.7881	3,492.47
i-Butane**	75-28-5	C4H10	58.122	0.3952	0.003952	0.2297	1.1765	605.31
n-Butane**	106-97-8	C4H10	58.122	0.5830	0.005830	0.3389	1.7356	892.96
Cyclopentane**	287-92-3	C5H10	70.100	0.0000	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	0.1525	0.001525	0.1100	0.5636	289.95
n-Pentane**	109-66-0	C5H12	72.149	0.1112	0.001112	0.0802	0.4109	211.42
Cyclohexane**	110-82-7	C6H12	84.159	0.0095	0.000095	0.0080	0.0410	21.07
Other Hexanes**	varies	C6H14	86.175	0.0698	0.000698	0.0602	0.3081	158.51
Methylcyclohexane**	varies	C7H14	98.186	0.0004	0.000004	0.0004	0.0020	1.03
Heptanes**	varies	C7H16	100.202	0.0388	0.000388	0.0389	0.1991	102.45
C8+ Heavies**	varies	C8+	114.229	0.0413	0.000413	0.0472	0.2416	124.32
Benzene***	71-43-2	C6H6	78.112	0.0011	0.000011	0.0009	0.0044	2.26
Ethylbenzene***	100-41-4	C8H10	106.165	0.0000	0.000000	0.0000	0.0000	0.00
n-Hexane***	110-54-3	C6H14	86.175	0.0329	0.000329	0.0284	0.1452	74.71
Toluene***	108-88-3	C7H8	92.138	0.0033	0.000033	0.0030	0.0156	8.01
2,2,4-TMP (i-octane)***	540-84-1	C8H18	114.229	0.0000	---	---	---	---
Xylenes***	1330-20-7	C8H10	106.165	0.0029	0.000029	0.0031	0.0158	8.11

Totals:	100.00	1.0000	19.5244	100.00	51,450.08
THC:	99.04	0.9904	19.2191	98.44	50,645.52
Total VOC:	4.45	0.0445	2.2741	11.65	5,992.60
Total HAP:	0.04	0.0004	0.0353	0.18	93.10

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

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 °F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

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

Compound	CAS	Formula	Representative Gas Analysis			Assumed "Worst-Case" Parameters		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.224	0.505	259.90	0.345	0.777	400.00
Methane	75-82-8	CH4	81.967	67.351	34,652.23	99.348	75.000	42,000.00
Ethane	74-84-0	CH5	12.621	19.438	10,000.69	15.270	25.000	12,100.00
VOC (Propane)	74-98-6	C3H8	4.447	11.647	5,992.60	5.343	13.994	7,200.00
Benzene	71-43-2	C6H6	0.0011	0.0044	2.26	0.0049	0.0194	10.00
Ethylbenzene	100-41-4	C8H10	0.0000	0.0000	0.00	0.0300	0.1500	10.00
n-Hexane	110-54-3	C6H14	0.0329	0.1452	74.71	0.0396	0.1749	90.00
Toluene	108-88-3	C7H8	0.0033	0.0156	8.01	0.0041	0.0194	10.00
2,2,4-TMP (i-octane)	540-84-1	C8H18	0.0000	0.0000	0.00	0.0050	0.0200	10.00
Xylenes	1330-20-7	C8H10	0.0029	0.0158	8.11	0.0300	0.1500	10.00
Total HAP:	Various	C6 thru C8	0.0402	0.1810	93.10	0.0604	0.2721	140.00

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment H

STARCOVIC EXTENDED GAS ANALYSIS

Legacy Measurement Solutions Good
 Shreveport, LA
 318-226-7237

Customer	: 2259 - WILLIAMS	Date Sampled	: 07/02/2014
Station ID	: 52060-50	Date Analyzed	: 07/11/2014
Cylinder ID	: w7018	Effective Date	: 08/01/2014
Producer	: 001350-CHEVRON USA INC	Cyl Pressure	: 900
Lease	: STARCOVIC MASTER	Temp	: 105
Area	: 500 - OHIO VALLEY MID	Cylinder Type	: Spot
State	: WV	Sample By	: CM

<u>COMPONENT</u>	<u>MOL%</u>	<u>GPM@14.73(Psia)</u>	<u>WT%</u>
Oxygen	0.0026	0.000	0.004
Nitrogen	0.7378	0.000	1.058
Methane	81.9672	0.000	67.329
Carbon-Dioxide	0.2241	0.000	0.505
Ethane	12.6209	3.385	19.431
Propane	3.0055	0.830	6.786
Iso-Butane	0.3952	0.130	1.176
Normal-Butane	0.5830	0.184	1.735
Iso-Pentane	0.1525	0.056	0.563
Normal-Pentane	0.1112	0.040	0.411
2,2-Dimethylbutane	0.0067	0.003	0.030
2,3-Dimethylbutane/CycloC5	0.0085	0.003	0.038
2-methylpentane	0.0333	0.014	0.147
3-methylpentane	0.0213	0.009	0.094
Normal-Hexane	0.0329	0.014	0.145
2,2-Dimethylpentane	0.0007	0.000	0.004
Methylcyclopentane	0.0054	0.002	0.023
BENZENE	0.0011	0.000	0.004
3,3-Dimethylpentane	0.0000	0.000	0.000
CYCLOHEXANE	0.0041	0.001	0.018
2-Methylhexane	0.0110	0.005	0.056
2,3-Dimethylpentane	0.0035	0.001	0.018
3-Methylhexane	0.0114	0.005	0.058
1,t2-DMCYC5 / 2,2,4-TMC5	0.0002	0.000	0.001
1,t3-Dimethylcyclopentane	0.0002	0.000	0.001
N-Heptane	0.0122	0.006	0.063
METHYLCYCLOHEXANE	0.0000	0.000	0.000
2,5-Dimethylhexane	0.0010	0.001	0.006
2,3-Dimethylhexane	0.0016	0.001	0.009
TOLUENE	0.0033	0.001	0.016
2-Methylheptane	0.0046	0.002	0.027
4-Methylheptane	0.0018	0.001	0.011
3-Methylheptane	0.0041	0.002	0.024
1,t4-Dimethylcyclohexane	0.0016	0.001	0.009
N-OCTANE / 1,T2-DMCYC6	0.0059	0.003	0.035
1,t3-DMCYC6/1,C4-DMCYC6/1,C2,C3-TMCYC5	0.0000	0.000	0.000
2,4,4 TMC6	0.0007	0.000	0.005
2,6-Dimethylheptane / 1,C2-DMCYC6	0.0018	0.001	0.012
Ethylcyclohexane	0.0000	0.000	0.000
O-XYLENE	0.0000	0.000	0.000
NONANE	0.0045	0.003	0.030
N-DECANE	0.0071	0.004	0.052
N-UNDECANE	0.0066	0.004	0.053
M-Xylene/P-Xylene	0.0029	0.001	0.016
TOTAL	100.0000	4.713	99.998



SAFETY DATA SHEET

1. Identification

Product identifier Natural Gas
Other means of identification Not available.
Synonyms Methane, Natural Gas Sweet, Fuel Gas, Petroleum Gas, Methyl Hydride
Recommended use Fuel.
Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Company name Williams, Inc.
Address One Williams Center
Tulsa, OK 74172
US
Telephone 800-688-7507
E-mail enterpriseehs@williams.com
Emergency phone number 888-677-2370

2. Hazard(s) identification

Physical hazards Flammable gases Category 1
Gases under pressure Compressed gas
Health hazards Not classified.
OSHA hazard(s) Simple asphyxiant

Label elements

Hazard symbol



Signal word Danger

Hazard statement Extremely flammable gas. Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statement

Prevention Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage Protect from sunlight. Store in a well-ventilated place.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) Not classified.

3. Composition/information on ingredients

Substance

Hazardous components
Chemical name

Common name and
synonyms

CAS number

%

Natural gas

8006-14-2

100

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Move injured person into fresh air and keep person calm under observation. If breathing is difficult, give oxygen. Get medical attention if any discomfort continues.

Skin contact Frostbite: Do not remove clothes, but flush with copious amounts of lukewarm water. Call an ambulance and continue to flush during transportation to hospital.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Most important symptoms/effects, acute and delayed	Narcosis. Behavioral changes. Decrease in motor functions.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Extinguish with foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	None.
Specific hazards arising from the chemical	Extremely flammable gas. Closed containers can burst violently when heated, due to excess pressure build-up. Gas may travel considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Fire or high temperatures create: Carbon monoxide. Carbon oxides. Sulfur oxides.
Special protective equipment and precautions for firefighters	Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined spaces.
Fire-fighting equipment/instructions	Evacuate area. Move container from fire area if it can be done without risk. Stay away from ends of tanks. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Cool equipment exposed to flames with water, if it can be done without risk. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Beware of accumulation in low areas or contained areas, where explosive concentrations may occur. Prevent from entering drains or any places where accumulation may occur. Ventilate well and allow to evaporate. Stay upwind. Avoid inhalation and contact with skin and eyes. For large spillages notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate personal protective equipment (See Section 8).
Methods and materials for containment and cleaning up	In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.
Environmental precautions	Stop leak if possible without any risk. Water may be useful in minimizing or dispersing vapors. If spill occurs on water notify appropriate authorities in accordance with all applicable regulations.

7. Handling and storage

Precautions for safe handling	Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. Observe good industrial hygiene practices. Wear appropriate personal protective equipment (See Section 8). Contents under pressure. Gas can accumulate in confined spaces and limit oxygen available for breathing. Use only with adequate ventilation. Use non-sparking hand tools and explosion-proof electrical equipment. The product can accumulate electrostatic charges, which may cause an electrical spark (ignition source). Ground container and transfer equipment to eliminate static electric sparks. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H ₂ S) and flammability. Cold burns may occur during filling operations. Containers and delivery lines may become cold enough to present cold burn hazard. The use hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of incomplete combustion products (e.g. carbon monoxide, oxides of sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.
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Conditions for safe storage, including any incompatibilities

Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post areas "No Smoking or Open Flame." Store away from incompatible materials. Protect against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

Empty containers may contain flammable product residues. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Natural gas (CAS 8006-14-2)	TWA	1000 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

No exposure standards allocated.

Appropriate engineering controls

Provide shower facilities near the work place. In confined spaces, make sure the area is well-ventilated and sufficient oxygen (19.5%) exists before entry. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear approved safety glasses as a good hygiene practice.

Skin protection

Hand protection

Wear suitable gloves as a good hygiene practice.

Other

Wear suitable protective clothing.

Respiratory protection

A NIOSH approved, self-containing breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH). A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Colorless gas.

Physical state

Gas Compressed.

Form

Gas.

Color

Colorless.

Odor

Odorless to slight, sweet.

Odor threshold

Not available.

pH

Not applicable.

Melting point/freezing point

Not available.

Initial boiling point and boiling range

-259.6 °F (-162 °C)

Flash point

-304.6 °F (-187 °C)

Evaporation rate

Not available.

Flammability (solid, gas)

Extremely flammable gas.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)

5 %

Flammability limit - upper (%)

15 %

Explosive limit - lower (%)

Not available.

Explosive limit - upper (%)

Not available.

Vapor pressure	40 mm Hg (77°F/25°C)
Vapor density	0.55 Approximate.
Relative density	Not available.
Solubility(ies)	Slightly soluble in water.
Partition coefficient (n-octanol/water)	1.81
Auto-ignition temperature	> 550.4 °F (> 288 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Percent volatile	100

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Polymerization will not occur.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Oxidizing agents.
Hazardous decomposition products	Carbon oxides. Sulfur oxides.

11. Toxicological information

Information on likely routes of exposure

Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Inhalation	High concentrations: Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. In high concentrations, vapors are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Eye contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Symptoms related to the physical, chemical and toxicological characteristics	Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn"). Contact with evaporating liquid may cause frostbite or freezing of skin. Symptoms of overexposure can include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting, and are reversible if exposure is stopped. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discoloration of skin), numbness of the extremities, unconsciousness and death.

Information on toxicological effects

Acute toxicity	Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").
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Product	Species	Test Results
Natural gas (CAS 8006-14-2)		
Acute		
Oral		
LD50	Rat	> 5 g/kg
Skin corrosion/irritation	Not classified.	
Serious eye damage/eye irritation	Not classified.	
Respiratory sensitization	Not classified.	
Skin sensitization	Not a skin sensitizer.	
Germ cell mutagenicity	Not classified.	
Carcinogenicity	Not classified.	
Reproductive toxicity	Not classified.	
Specific target organ toxicity - single exposure	Not classified.	
Specific target organ toxicity - repeated exposure	Not classified.	

Aspiration hazard Not applicable.
Chronic effects Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.
Persistence and degradability The hydrocarbons in this material are expected to be inherently biodegradable. In practice, hydrocarbon gases are not likely to remain in solution long enough for biodegradation to be a significant loss process. Hydrogen sulfide, if present in refinery gas streams, will be oxidized in water and insoluble sulfides precipitated from water when metallic radicals are present.
Bioaccumulative potential The product is not expected to bioaccumulate.
Partition coefficient n-octanol / water (log Kow)
Natural gas 1.81
Mobility in soil Not relevant, due to the form of the product.
Mobility in general The product is a volatile substance, which may spread in the atmosphere.
Other adverse effects The product is a volatile organic compound which has a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions This material is a gas and would not typically be managed as a waste.
Local disposal regulations Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.
Hazardous waste code D001
Waste from residues / unused products Dispose of in accordance with local regulations.
Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN1971
UN proper shipping name Natural gas, compressed
Transport hazard class(es) 2.1
Subsidiary class(es) Not available.
Packing group Not available.
Special precautions for user Not available.
Labels required 2.1
Packaging exceptions 306
Packaging non bulk 302
Packaging bulk 302

IATA

UN number UN1971
UN proper shipping name Natural gas, compressed
Transport hazard class(es) 2.1
Subsidiary class(es) -
Packaging group Not available.
Environmental hazards No
Labels required 2.1
ERG Code 10L
Special precautions for user Not available.

IMDG

UN number UN1971
UN proper shipping name NATURAL GAS, COMPRESSED
Transport hazard class(es) 2.1
Subsidiary class(es) -
Packaging group Not available.
Environmental hazards
Marine pollutant No
Labels required 2,1
EmS F-D, S-U
Special precautions for user Not available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code No information available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not on regulatory list.

CERCLA Hazardous Substance List (40 CFR 302.4)

Natural gas (CAS 8006-14-2) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

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

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Not listed.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

Food and Drug Administration (FDA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Natural gas (CAS 8006-14-2)

US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

US. Pennsylvania RTK - Hazardous Substances

Natural gas (CAS 8006-14-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

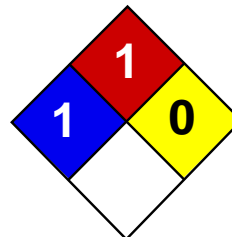
Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other information, including date of preparation or last version

Issue date	11-08-2012
Revision date	-
Version #	01
Further information	Not available.
References	Registry of Toxic Effects of Chemical Substances (RTECS)
Disclaimer	This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.



Health	1
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet

Triethylene glycol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Triethylene glycol

Catalog Codes: SLT2644

CAS#: 112-27-6

RTECS: YE4550000

TSCA: TSCA 8(b) inventory: Triethylene glycol

CI#: Not available.

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

Chemical Formula: 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.

Created: 10/10/2005 08:31 PM

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

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MATERIAL SAFETY DATA SHEET

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Natural Gas Condensate

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

Manufacturer Name:

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

Emergency Telephone:

888-677-2370

Non-emergency Telephone:

800-688-7507

Intended Use: Industrial use

2 HAZARDS IDENTIFICATION

Emergency Overview

Physical State: Liquid

Color: Colorless to brownish-black

Odor: Petroleum

DANGER!

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

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

Potential Health Effects

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

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

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

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

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

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

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

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

3 COMPOSITION / INFORMATION ON INGREDIENTS

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

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

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

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

4 FIRST AID MEASURES

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

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

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

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

5 FIRE-FIGHTING MEASURES

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

Unsuitable Extinguishing Media: Not applicable.

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

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

Hazardous Combustion Products: Carbon Oxides

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear protective clothing as described in Section 8 of this safety data sheet.

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

7 HANDLING AND STORAGE

Handling: Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

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

8 EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Limits:**

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

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

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

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

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

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

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

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

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

9	PHYSICAL AND CHEMICAL PROPERTIES
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Color: Colorless to brownish-black

Odor: Petroleum

Odor Threshold: No data available.

Physical State: Liquid

pH: Not applicable

Melting Point: No data available.

Freezing Point: No data available.

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

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

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

Flammability (Solid): No data available.

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

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

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

Vapor Density (Air=1): > 1

Specific Gravity: 0.766 - 0.87

Solubility in Water: Negligible

Solubility (Other): No data available.

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

Autoignition Temperature: No data available.

Decomposition Temperature: No data available.

Viscosity: < 1 cst @38°C

Percent Volatile: 100 %vol

Explosive Properties: No data available

10 STABILITY AND REACTIVITY

Stability: Stable under the prescribed storage conditions.

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

Incompatible Materials: Strong oxidizing agents.

Hazardous Decomposition Products: No data available.

11 TOXICOLOGICAL INFORMATION**Specified Substance(s)****Acute Toxicity:****Test Results:**

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

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

Listed Carcinogens:

Chemical Name	IARC	NTP	OSHA	ACGIH
Benzene	1	Listed	Listed	A1

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

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

Product Information**Acute Toxicity:**

Test Results: No test data available for the product.

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

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

12 ECOLOGICAL INFORMATION

Ecotoxicity: There are no data on the ecotoxicity of this product.

Mobility: No data available.

Persistence and Degradability: No data available.

Bioaccumulation Potential: No data available.

13	DISPOSAL CONSIDERATIONS
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General Information: Dispose of waste and residues in accordance with local authority requirements.

Disposal Methods: No specific disposal method required.

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

14	TRANSPORT INFORMATION
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DOT

UN No.: UN1993

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

Class: 3

Packing Group: II

Label(s): 3

TDG

UN No.: UN1993

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

Class: 3

Packing Group: II

IATA

UN No.: UN1993

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

Class: 3

Packing Group: II

Label(s): 3

IMDG

UN No.: UN1993

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

Class: 3

Packing Group: II

EmS No.: F-E, S-E

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

WHMIS Classification: B2, D2A, D2B

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

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

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

Inventory Status

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

US Regulations

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Name	RQ
Benzene	10 lbs

SARA Title III

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

Section 311/312 (40 CFR 370):

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

Section 313 Toxic Release Inventory (40 CFR 372):

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

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

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

Not regulated.

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

Drug Enforcement Act: Not regulated.

TSCA

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

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

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

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

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

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	2	4	0	NONE

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

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

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	2*	4	0	--

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

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

Issue Date: 31-Mar-2009**Supersedes Date:** 28-Jul-1999**SDS No.:** 1023419**Disclaimer:** This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

ATTACHMENT I
Emission Units Table

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

- **Emissions Unit Table**
-

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
STARCOVIC COMPRESSOR STATION
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EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)		
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr					
CE-1 (1E)	Upward Vertical Stack	Compressor Engine - Ajax DPC-2802LE						C	8,760	NOX	1.76	7.72	1.76	7.72	Gas	Vendor	
		CO	1.06	4.63	1.06	4.63	Gas			Vendor							
		VOC	0.97	4.25	0.97	4.25	Gas			Vendor							
		SO2	2.1E-03	0.01	2.1E-03	0.01	Gas			AP-42							
		PM10/2.5	0.17	0.75	0.17	0.75	Solid/Gas			AP-42							
		Benzene	0.01	0.03	0.01	0.03	Gas			AP-42							
		Ethylbenzene	3.8E-04	1.7E-03	3.8E-04	1.7E-03	Gas			AP-42							
		HCHO	0.26	1.16	0.26	1.16	Gas			Vendor							
		n-Hexane	1.6E-03	0.01	1.6E-03	0.01	Gas			AP-42							
		Toluene	3.4E-03	0.01	3.4E-03	0.01	Gas			AP-42							
		2,2,4-TMP	3.0E-03	0.01	3.0E-03	0.01	Gas			AP-42							
		Xylenes	9.5E-04	4.1E-03	9.5E-04	4.1E-03	Gas			AP-42							
		Other HAP	0.07	0.30	0.07	0.30	Gas			AP-42							
		Total HAP	0.35	1.53	0.35	1.53	Gas			AP-42							
		CO2e	526	2,305	526	2,305	Gas			EPA							
RSV-1 (2E)	Upward Vertical Stack	TEG Dehydrator - Flash Tank & Still Vent						C	8,760	NOX	---	---	---	---	---	---	
		CO	---	---	---	---	---			---							
		VOC	6.58	28.82	6.58	28.82	Gas			Model							
		SO2	---	---	---	---	Gas			---							
		PM10/2.5	---	---	---	---	---			---							
		Benzene	0.14	0.60	0.14	0.60	Gas			Model							
		Ethylbenzene	0.11	0.50	0.11	0.50	Gas			Model							
		HCHO	---	---	---	---	Gas			Model							
		n-Hexane	0.09	0.39	0.09	0.39	Gas			Model							
		Toluene	0.70	3.05	0.70	3.05	Gas			Model							
		2,2,4-TMP	0.11	0.50	0.11	0.50	Gas			Model							
		Xylenes	1.24	5.42	1.24	5.42	Gas			Model							
		Other HAP	---	---	---	---	Gas			Model							
		Total HAP	2.16	9.46	2.16	9.46	Gas			Model							
		CO2e	356	1,558	356	1,558	Gas			Model							

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		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr				
RBV-1 (3E)	Upward Vertical Stack	TEG Dehydrator - Reboiler						8,760	NOX	0.04	0.18	0.04	0.18	Gas	AP-42	
		CO	0.03	0.15	0.03	0.15	Gas		AP-42							
		VOC	2.3E-03	0.01	2.3E-03	0.01	Gas		AP-42							
		SO2	2.4E-04	1.1E-03	2.4E-04	1.1E-03	Gas		AP-42							
		PM10/2.5	3.1E-03	0.01	3.1E-03	0.01	Solid/Gas		AP-42							
		Benzene	8.6E-07	3.7E-06	8.6E-07	3.7E-06	Gas		AP-42							
		Ethylbenzene	---	---	---	---	---		---							
		HCHO	3.1E-05	1.3E-04	3.1E-05	1.3E-04	Gas		AP-42							
		n-Hexane	7.3E-04	3.2E-03	7.3E-04	3.2E-03	Gas		AP-42							
		Toluene	1.4E-06	6.1E-06	1.4E-06	6.1E-06	Gas		AP-42							
		2,2,4-TMP	---	---	---	---	---		---							
		Xylenes	---	---	---	---	---		---							
		Other HAP	7.7E-07	3.4E-06	7.7E-07	3.4E-06	Gas		AP-42							
		Total HAP	7.7E-04	3.4E-03	7.7E-04	3.4E-03	Gas		AP-42							
CO2e	49	216	49	216	Gas	EPA										
T01 (4E)	Upward Vertical Stack	Storage Tank - Produced Water						8,760	NOX	---	---	---	---	---	---	
		CO	---	---	---	---	---		---							
		VOC	0.02	0.12	0.02	0.12	Gas		Model							
		SO2	---	---	---	---	---		---							
		PM10/2.5	---	---	---	---	---		---							
		Benzene	5.1E-04	2.4E-03	5.1E-04	2.4E-03	Gas		Model							
		Ethylbenzene	5.1E-04	2.4E-03	5.1E-04	2.4E-03	Gas		Model							
		HCHO	---	---	---	---	---		---							
		n-Hexane	1.7E-03	0.01	1.7E-03	0.01	Gas		Model							
		Toluene	5.1E-04	2.4E-03	5.1E-04	2.4E-03	Gas		Model							
		2,2,4-TMP	5.1E-04	2.4E-03	5.1E-04	2.4E-03	Gas		Model							
		Xylenes	5.1E-04	2.4E-03	5.1E-04	2.4E-03	Gas		Model							
		Other HAP	---	---	---	---	---		---							
		Total HAP	4.3E-03	0.02	4.3E-03	0.02	Gas		Model							
CO2e	0	7	0	7	Gas	EPA										

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		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr				
TLO (5E)	Upward Vertical Stack	Truck Load-Out - Produced Water					I	na	NOX	---	---	---	---	---	---	
		CO	---	---	---	---			---							
		VOC	---	0.26	---	0.26			Gas	AP-42						
		SO2	---	---	---	---			---	---						
		PM10/2.5	---	---	---	---			---	---						
		Benzene	---	0.01	---	0.01			Gas	AP-42						
		Ethylbenzene	---	0.01	---	0.01			Gas	AP-42						
		HCHO	---	---	---	---			---	---						
		n-Hexane	---	0.03	---	0.03			Gas	AP-42						
		Toluene	---	0.01	---	0.01			Gas	AP-42						
		2,2,4-TMP	---	0.01	---	0.01			Gas	AP-42						
		Xylenes	---	0.01	---	0.01			Gas	AP-42						
		Other HAP	---	---	---	---			---	---						
		Total HAP	---	0.06	---	0.06			Gas	AP-42						
CO2e	---	---	---	---	---	---										
SSM (6E)	Varies	Startup/Shutdown/Maintenance					I	na	NOX	---	---	---	---	---	---	
		CO	---	---	---	---			---	---						
		VOC	---	2.39	---	2.39			Gas	MB						
		SO2	---	---	---	---			---	---						
		PM10/2.5	---	---	---	---			---	---						
		Benzene	---	0.01	---	0.01			Gas	MB						
		Ethylbenzene	---	0.01	---	0.01			Gas	MB						
		HCHO	---	---	---	---			---	---						
		n-Hexane	---	0.03	---	0.03			Gas	MB						
		Toluene	---	0.01	---	0.01			Gas	MB						
		2,2,4-TMP	---	0.01	---	0.01			Gas	MB						
		Xylenes	---	0.01	---	0.01			Gas	MB						
		Other HAP	---	---	---	---			---	---						
		Total HAP	---	0.05	---	0.05			Gas	MB						
CO2e	---	348	---	348	Gas	EPA										

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		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr						
RPC (7E)	Upward Vertical Stack	RPC (7E)	RPC (7E)	na	na	C	8,760	NOX	---	---	---	---	---	---				
								CO	---	---	---	---	---	---	---	---	---	
								VOC	0.26	1.16	0.26	1.16	Gas	Vendor				
								SO2	---	---	---	---	---	---				
								PM10/2.5	---	---	---	---	---	---				
								Benzene	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								Ethylbenzene	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								HCHO	4.2E-03	0.02	4.2E-03	0.02	Gas	MB				
								n-Hexane	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								Toluene	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								2,2,4-TMP	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								Xylenes	1.0E-03	4.5E-03	1.0E-03	4.5E-03	Gas	MB				
								Other HAP	---	---	---	---	---	---				
								Total HAP	0.01	0.05	0.01	0.05	Gas	MB				
CO2e	45	196	45	196	Gas	EPA												

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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EMISSION POINTS DATA SUMMARY SHEET - Continued

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 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										
Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	NOX	1.80	7.90	1.80	7.90	Gas	Varies								
								Total Plant-Wide (w/o Fugitives)							CO	1.09	4.78	1.09	4.78	Gas	Varies	
								VOC	7.83	37.00	7.83	37.00	Gas	Varies								
								SO2	2.3E-03	0.01	2.3E-03	0.01	Gas	Varies								
								PM10/2.5	0.17	0.76	0.17	0.76	Solid/Gas	Varies								
								Benzene	0.15	0.65	0.15	0.65	Gas	Varies								
								Ethylbenzene	0.12	0.52	0.12	0.52	Gas	Varies								
								HCHO	0.27	1.18	0.27	1.18	Gas	Varies								
								n-Hexane	0.09	0.46	0.09	0.46	Gas	Varies								
								Toluene	0.70	3.09	0.70	3.09	Gas	Varies								
								2,2,4-TMP	0.12	0.54	0.12	0.54	Gas	Varies								
								Xylenes	1.24	5.45	1.24	5.45	Gas	Varies								
								Other HAP	0.07	0.30	0.07	0.30	Gas	Varies								
								Total HAP	2.53	11.17	2.53	11.17	Gas	Varies								
CO2e	976	4,630	976	4,630	Gas	Varies																
Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	NOX	1.80	7.90	1.80	7.90	Gas	Varies								
								Total Plant-Wide (w/ Fugitives)							CO	1.09	4.78	1.09	4.78	Gas	Varies	
								VOC	10.45	48.48	10.45	48.48	Gas	Varies								
								SO2	2.3E-03	0.01	2.3E-03	0.01	Gas	Varies								
								PM10/2.5	0.17	0.76	0.17	0.76	Solid/Gas	Varies								
								Benzene	0.21	0.93	0.21	0.93	Gas	Varies								
								Ethylbenzene	0.18	0.80	0.18	0.80	Gas	Varies								
								HCHO	0.27	1.18	0.27	1.18	Gas	Varies								
								n-Hexane	0.29	1.32	0.29	1.32	Gas	Varies								
								Toluene	0.77	3.37	0.77	3.37	Gas	Varies								
								2,2,4-TMP	0.18	0.82	0.18	0.82	Gas	Varies								
								Xylenes	1.30	5.73	1.30	5.73	Gas	Varies								
								Other HAP	0.07	0.30	0.07	0.30	Gas	Varies								
								Total HAP	3.01	13.27	3.01	13.27	Gas	Varies								
CO2e	1,092	5,137	1,092	5,137	Gas	Varies																

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**
-

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Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not 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
<p>1.) Will there be haul road activities?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If Yes, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.</p>
<p>2.) Will there be Storage Piles?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If Yes, then complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.</p>
<p>3.) Will there be Liquid Loading/Unloading Operations?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ((Truck Load-Out (TLO (5E)) is included in the Point Source Emissions))</p> <p><input type="checkbox"/> If Yes, then complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.</p>
<p>4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.</p>
<p>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.)?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> If Yes, then complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS DATA SHEET.</p>
<p>6.) Will there be General Clean-up VOC Operations?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.</p>
<p>7.) Will there be any other activities that generate fugitive emissions?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.</p> <p>If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."</p>

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FUGITIVE EMISSIONS 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.

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) (5E) is included in the Point Source Emissions))					
Wastewater Treatment	na	---	---	---	---	---
Process and Piping Fugitives (FUG-G (1F) and FUG-W (2F) (Total Combined)	VOC	2.62	11.47	2.62	11.47	O - AP-42
	Benzene	0.06	0.28	0.06	0.28	O - AP-42
	E-Benzene	0.06	0.28	0.06	0.28	O - AP-42
	Formaldehyde	---	---	---	---	---
	n-Hexane	0.20	0.86	0.20	0.86	O - AP-42
	Toluene	0.06	0.28	0.06	0.28	O - AP-42
	2,2,4-TMP	0.06	0.28	0.06	0.28	O - AP-42
	Xylenes	0.06	0.28	0.06	0.28	O - AP-42
	Other HAP	---	---	---	---	---
	Total HAP	0.48	2.10	0.48	2.10	O - AP-42
CO ₂ e	116	507	116	507	O - GWP	
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, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases, etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

² Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in 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).

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Attachment K

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (Days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps⁵	Light Liquid VOC ^{6,7}	4	na - LDAR Does <i>NOT</i> Apply		See ATTACHMENT N EMISSION CALCULATIONS
	Heavy Liquid VOC ⁸	---			
	Non-VOC ⁹	---			
Valves¹⁰	Gas VOC	386			
	Light Liquid VOC	193			
	Heavy Liquid VOC	---			
	Non-VOC	---			
Safety Relief Valves¹¹	Gas VOC	See "Other"			
	Light Liquid VOC	See "Other"			
	Non-VOC	---			
Open Ended Lines¹²	Gas VOC	21			
	Light Liquid VOC	11			
	Non-VOC	---			
Sampling Connections¹³	Gas VOC	See "Open Ended Lines"			
	Light Liquid VOC	See "Open Ended Lines"			
	Non-VOC	---			
Compressors	Gas VOC	See "Other"			
	Non-VOC	---			
Flanges	Gas VOC	180			
	Light Liquid VOC	90			
	Non-VOC	---			
Other (Connectors)	Gas VOC	1,151			
	Light Liquid VOC	575			
	Non-VOC	---			

Continued ...

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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; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); 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, NO₂, SO₂, etc. DO NOT LIST CO, H₂, N₂, O₂, 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
 - Ajax 2802LE Compressor Engine – Vendor Data
 - Natural Gas Glycol Dehydration Unit Data Sheet
 - 40 CFR Part 63; Subpart HH & HHH Registration Form
 - Storage Tank Data Sheet
 - Storage Tank List (Insignificant Sources)
 - Bulk Liquid Transfer Operations
-

Williams Ohio Valley Midstream LLC
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Attachment L

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Compressor Station		Starcovic			
Source Identification Number ¹		CE-1			
Engine Manufacturer and Model		Ajax DPC-2802LE			
Manufacturer's Rated bhp/rpm		400 / 440			
Source Status ²		ES			
Date Installed/Modified/Removed ³		2011			
Manufactured/Reconstruction Date ⁴		July 1, 2000			
Certified Engine (40CFR60 NSPS JJJJ) ⁵		No			
Engine, Fuel and Combustion Data	Engine Type ⁶	LB2S			
	APCD Type ⁷	na			
	Fuel Type ⁸	RG			
	H ₂ S (gr/100 scf)	0.2			
	Operating bhp/rpm	400 / 440			
	BSFC (Btu/bhp-hr)	8,837			
	Fuel (ft ³ /hr)	3,391			
	Fuel (MMft ³ /yr)	29.71			
	Operation (hrs/yr)	8,760			
Reference ⁹	PTE ¹⁰	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NOx	1.76	7.72		
MD	CO	1.06	4.63		
MD	VOC	0.97	4.25		
AP	SOx	2.1E-03	0.01		
AP	PM10/2.5	0.17	0.75		
MD/AP	Benzene	0.01	0.03		
MD/AP	Ethylbenzene	3.8E-04	1.7E-03		
MD	HCHO	0.26	1.16		
MD/AP	n-Hexane	1.6E-03	0.01		
MD/AP	Toluene	3.4E-03	0.01		
MD/AP	2,2,4-TMP	3.0E-03	0.01		
MD/AP	Xylenes	9.5E-04	4.1E-03		
MD/AP	Other HAP	0.07	0.30		
MD/AP	Total HAP	0.35	1.53		
MD/AP	CO ₂	414	1,811		
MD/AP	CH ₄	4	20		
MD/40CFR98	N ₂ O	7.79E-04	3.41E-03		
MD/40CFR98	CO ₂ e	526	2,305		

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Attachment L

ATTACHMENT L - 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 Unit 1090 Ajax 2802LE Engine Emissions

Date of Manufacture	July 1, 2000	Package Serial Number	84559	Date Modified/Reconstructed	Not Any
Driver Rated HP	400	Rated Speed in RPM	440	Combustion Type	Spark Ignited 2 Stroke
Number of Cylinders	2	Compression Ratio	6.1:1	Combustion Setting	Lean Burn
Displacement, in ³	5652	Fuel Delivery Method	Fuel Injected	Combustion Air Treatment	Naturally Aspirated

Raw Engine Emissions (Pipeline Quality Fuel Gas with little to no H2S)

Fuel Consumption 7800 LHV BTU/bhp-hr or 8580 HHV BTU/bhp-hr
Altitude 1500 ft
Maximum Air Inlet Temp 65 F

	<u>g/bhp-hr¹</u>	<u>lb/MMBTU²</u>	<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx)	2.0		1.76	7.72
Carbon Monoxide (CO)	1.2		1.06	4.63
Volatile Organic Compounds (VOC or NMNEHC)	0.8		0.71	3.09
Formaldehyde (CH2O)	0.3		0.26	1.16
Particulate Matter (PM) <small>Filterable+Condensable</small>		4.83E-02	1.66E-01	7.26E-01
Sulfur Dioxide (SO2)		5.88E-04	2.02E-03	8.84E-03
	<u>g/bhp-hr¹</u>		<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Carbon Dioxide (CO2)	NA		NA	NA
Methane (CH4)	5.1		4.50	17.87

¹ g/bhp-hr are based on Cameron Specifications assuming pipeline quality fuel gas, < 1500 ft elevation, and 65 F Air Inlet Temperature.

Note that g/bhp-hr values are based on 100% Load Operation.

It is recommended to apply a safety factor to CO emissions of 3.26, VOC emissions of 1.5, and CH2O emissions of 1.5 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 Combustion Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-1).

Catalytic Converter Emissions

Catalytic Converter Make and Model: None
Number of Elements in Housing: 0

	<u>% Reduction</u>	<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx)	0	1.76	7.72
Carbon Monoxide (CO)	0	1.06	4.63
Volatile Organic Compounds (VOC or NMNEHC)	0	0.71	3.09
Formaldehyde (CH2O)	0	0.26	1.16
Particulate Matter (PM)	0	1.66E-01	7.26E-01
Sulfur Dioxide (SO2)	0	2.02E-03	8.84E-03
	<u>% Reduction</u>	<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Carbon Dioxide (CO2)	0	NA	NA
Methane (CH4)	0	4.50	17.87

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Attachment L

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Compressor Station		Starcovic			
		Manufacturer and Model		KW Int'l			
		Max Dry Gas Flow Rate (MMscfd)		17.0			
		Heat Input (MMBtu/hr) - HHV		0.42			
		Design Type (DEG or TEG)		TEG			
		Source Status ²		ES			
		Date Installed/Modified/Removed ³		2011			
		Regenerator Still Vent APCD ⁴		NA			
		Fuel HV (Btu/scf) - HHV		1,020			
		H ₂ S Content (gr/100 scf)		0.2			
		Operation (hrs/yr)		8,760			
Source ID # ¹	Vent	Reference ⁵	PTE ⁶	lbs/hr	tons/yr	lbs/hr	tons/yr
RSV-1 (2E)	Dehydrator 01 Flash Tank + Still Vent (Minimum of 50% "Recycle" of Flash Gas as Fuel in the Reboiler)	GRI-GLYCalc	VOC	6.58	28.82		
		GRI-GLYCalc	Benzene	0.14	0.60		
		GRI-GLYCalc	E-Benzene	0.11	0.50		
		GRI-GLYCalc	Formaldehyde	---	---		
		GRI-GLYCalc	n-Hexane	0.09	0.39		
		GRI-GLYCalc	Toluene	0.70	3.05		
		GRI-GLYCalc	2,2,4-TMP	0.11	0.50		
		GRI-GLYCalc	Xylenes	1.24	5.42		
		GRI-GLYCalc	Other HAPs	---	---		
		GRI-GLYCalc	Total HAP	2.16	9.46		
		GRI-GLYCalc	CO ₂ e	356	1,558		
RBV-01 (3E)	Dehydrator 01 Reboiler Vent	AP-42	NOX	0.04	0.18		
		AP-42	CO	0.03	0.15		
		AP-42	VOC	2.3E-03	0.01		
		AP-42	SO ₂	2.4E-04	1.1E-03		
		AP-42	PM _{10/2.5}	3.1E-03	0.01		
		AP-42	Benzene	8.6E-07	3.7E-06		
		AP-42	E-Benzene	---	---		
		AP-42	Formaldehyde	3.1E-05	1.3E-04		
		AP-42	n-Hexane	7.3E-04	3.2E-03		
		AP-42	Toluene	1.4E-06	6.1E-06		
		AP-42	2,2,4-TMP	---	---		
		AP-42	Xylenes	---	---		
		AP-42	Other HAPs	7.7E-07	3.4E-06		
		AP-42	Total HAP	7.7E-04	3.4E-03		
		40CFR98	CO ₂ e	49	216		

ATTACHMENT L - 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
STARCOVIC 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):	17 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.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The affected facility processes, upgrades, or stores natural gas prior to the point at which natural gas (NG) enters the NG transmission and storage source category or is delivered to the end user.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The affected facility is:	<input checked="" type="checkbox"/> prior to a NG processing plant <input type="checkbox"/> NG processing plant <input type="checkbox"/> prior to the point of custody transfer and there is no NG processing plant
The affected facility transports or stores natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company).	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
The affected facility exclusively processes, stores, or transfers black oil with an initial producing gas-to-oil ratio (GOR): na scf/bbl API gravity: na degrees	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Section B: Dehydration Unit (if applicable)¹	
Description: 17 MMscfd - TEG Dehy 01 (RSV-1 (2E))	
Date of Installation: 2011	Annual Operating Hours: 8,760 Burner rating (MMBtu/hr): 0.375
Exhaust Stack Height (ft): 10.0	Stack Diameter (ft): 0.6 Stack Temp. (oF): 212
Glycol Type: <input checked="" type="checkbox"/> TEG <input type="checkbox"/> EG <input type="checkbox"/> Other: na	
Glycol Pump Type: <input type="checkbox"/> Elect <input checked="" type="checkbox"/> Gas If Gas, what is the volume ratio?: 0.08 acfm/gpm	
Condenser installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Exit Temp: na Condenser Pressure: na	
Incinerator/flare installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Destruction Eff.: na	
Other controls installed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe: na	
Wet Gas ² : Gas Temperature: 70 oF Gas Pressure: 1,000 psig	
(Upstream of Contact Tower)	Saturated Gas?: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, water content?: na
Dry Gas: Gas Flowrate: Actual: 17 MMscfd Design: 17 MMscfd	
(Downstream of Contact Tower)	Water Content: 7.0 lb/MMscf
Lean Glycol: Circulation Rate: Actual ³ : 0.67 gpm Max ⁴ : 1.5 gpm	
Pump make/model: Kimray 9015PV	
Glycol Flash Tank (if applicable): Temp: 165 oF Pressure: 50 psig Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
If no, describe vapor control: At least 50% of flash tank vapors used as reboiler fuel, the remainder is vented to atmosphere.	
Stripping Gas (if applicable): Source of Gas na Rate: na	

Attachment L

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

- 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).

Affected facility status:
(choose only one)

- 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 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 STARCOVIC COMPRESSOR STATION	2. Tank Name 210 BBL PRODUCED WATER STORAGE TANK
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) T01	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 4E
5. Date of Commencement of Construction (for existing tanks) na	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <p style="text-align: center;">210 BBL</p>	
9A. Tank Internal Diameter (ft) <p style="text-align: center;">10</p>	9B. Tank Internal Height (or Length) (ft) <p style="text-align: center;">16</p>
10A. Maximum Liquid Height (ft) <p style="text-align: center;">14</p>	10B. Average Liquid Height (ft) <p style="text-align: center;">8</p>
11A. Maximum Vapor Space Height (ft) <p style="text-align: center;">16</p>	11B. Average Vapor Space Height (ft) <p style="text-align: center;">8</p>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <p style="text-align: center;">210 BBL</p>	

13A. Maximum annual throughput (gal/yr) 105,840 GAL/YR	13B. Maximum daily throughput (gal/day) 290
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 12	
15. Maximum tank fill rate (gal/min) 200 GAL/MIN	
16. Tank fill method <input type="checkbox"/> Submerged <input checked="" type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year CONTINUOUS
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof X vertical ___ horizontal flat roof X cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

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

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

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

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

IV. SITE 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 Adsorption¹
- Condenser¹
- Conservation Vent (psig)

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

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		
Produced Water				240	EPA-450/3-85-001a / 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 <i>Equipment List Form</i>): TLO				
1. Loading Area Name: STARCOVIC COMPRESSOR STATION				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): <input type="checkbox"/> Drums <input type="checkbox"/> Marine Vessels <input type="checkbox"/> Rail Tank Cars <input checked="" type="checkbox"/> Tank Trucks				
3. Loading Rack or Transfer Point Data:				
Number of pumps	1			
Number of liquids loaded	1			
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1			
4. Does ballasting of marine vessels occur at this loading area? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <u>Does not apply</u>				
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: NA				
6. Are cargo vessels pressure tested for leaks at this or any other location? NA <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <u>Does not apply</u> If YES, describe: NA				
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)	105.8					
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 <i>Air Pollution Control Device Sheets</i>): CA = Carbon Adsorption, LOA = Lean Oil Adsorption, CO = Condensation, SC = Scrubber (Absorption), CRA = Compressor-Refrigeration-Absorption, TO = Thermal Oxidation or Incineration, CRC = Compression-Refrigeration-Condensation, VB = Dedicated Vapor Balance (closed system), O = other (describe)						
⁵ EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance TM = Test Measurement based upon test data submittal O = other (describe)						

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

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

MONITORING

RECORDKEEPING

REPORTING

TESTING

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

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

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

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

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

NA

ATTACHMENT M
Air Pollution Control Device Sheet(s)
(Not Applicable)

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

ATTACHMENT N

Supporting Emissions Calculations

“30. Provide all **Supporting Emissions Calculations** as Attachment N.”

- **Emission Summary Spreadsheets**
 - Potential to Emit (PTE) – CRITERIA POLLUTANTS – CONTROLLED
 - Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS – CONTROLLED
 - Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – CONTROLLED
 - Potential to Emit (PTE) – PRE-CONTROLLED
 - **Unit-Specific Emission Spreadsheets**
 - Compressor Engine – 400 bhp Ajax 2802LE (2SLB@440 rpm)
 - Triethylene Glycol (TEG) Dehydrator – 17 MMscfd
 - Triethylene Glycol (TEG) Reboiler – 0.375 MMBtu/hr
 - Storage Tank – 210 bbl Produced Water
 - Truck Load-Out – 2,520 bbl/yr Produced Water
 - Startup/Shutdown/Maintenance (SSM)
 - Rod Packing/Crankcase Emissions (RPC)
 - Process Piping Fugitives – Gas & Condensate
 - **AP-42 and GHG Emission Factors**
 - **Model Results**
 - Dehydrator - GRI-GLYCalc 4.0
 - Summary of Emissions
 - Summary of Input Values
 - Aggregate Calculations Report
 - Storage Tank - ProMax
 - Flowchart
 - Workbook
-

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

POTENTIAL-TO-EMIT (PTE) – CRITERIA POLLUTANTS – CONTROLLED

Unit ID	Point ID	Control ID	Description	Site Rating	NOX		CO		VOC		SO2		PM10/2.5	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	1E	na	Compressor Engine - Ajax DPC-2802LE	400 bhp	1.76	7.72	1.06	4.63	0.97	4.25	2.1E-03	0.01	0.17	0.75
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	17 MMscfd	---	---	---	---	6.58	28.82	---	---	---	---
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.375 MMBtu/hr	0.04	0.18	0.03	0.15	2.3E-03	0.01	2.4E-04	1.1E-03	3.1E-03	0.01
T01	4E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.12	---	---	---	---
TLO	5E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.26	---	---	---	---
SSM	6E	na	Startup/Shutdown/Maintenance	400 bhp	---	---	---	---	---	2.39	---	---	---	---
RPC	7E	na	Rod Packing/Crankcase Leaks	400 bhp	---	---	---	---	0.26	1.16	---	---	---	---
TOTAL POINT SOURCE EMISSIONS:					1.80	7.90	1.09	4.78	7.83	37.00	2.3E-03	0.01	0.17	0.76

WV NSR THRESHOLD:

6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy
---------------------------	---------------------------	---------------------------	---------------------------	---------------------------

TVOP THRESHOLD:

---	100	---	100	---	100	---	100
-----	-----	-----	-----	-----	-----	-----	-----

FUG-G	1F	na	Piping and Equipment Fugitives - Gas	1,737 units	---	---	---	---	0.76	3.33	---	---	---	---
FUG-W	2F	na	Piping and Equipment Fugitives - Condensate	873 units	---	---	---	---	1.86	8.14	---	---	---	---
TOTAL FUGITIVE EMISSIONS:					---	---	---	---	2.62	11.47	---	---	---	---

TOTAL FACILITY-WIDE EMISSIONS:

1.80	7.90	1.09	4.78	10.45	48.48	2.3E-03	0.01	0.17	0.76
-------------	-------------	-------------	-------------	--------------	--------------	----------------	-------------	-------------	-------------

- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr.
 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 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

POTENTIAL-TO-EMIT (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – CONTROLLED

Unit ID	Point ID	Benzene CAS: 71-43-2 MW: 78.11 lb/lb-mol		Ethylbenzene CAS: 121-69-16 MW: 106.17 lb/lb-mol		Formaldehyde CAS: 121-69-26 MW: 30.03 lb/lb-mol		n-Hexane CAS: 121-69-34 MW: 86.18 lb/lb-mol		Toluene CAS: 121-69-87 MW: 92.14 lb/lb-mol		2,2,4-TMP CAS: 121-69-94 MW: 114.23 lb/lb-mol		Xylenes CAS: 121-69-99 MW: 106.17 lb/lb-mol		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-1	1E	0.01	0.03	3.8E-04	1.7E-03	0.26	1.16	1.6E-03	0.01	3.4E-03	0.01	3.0E-03	0.01	9.5E-04	4.1E-03	0.07	0.30	0.35	1.53		
RSV-1	2E	0.14	0.60	0.11	0.50	---	---	0.09	0.39	0.70	3.05	0.11	0.50	1.24	5.42	---	---	2.16	9.46		
RBV-1	3E	8.6E-07	3.7E-06	---	---	3.1E-05	1.3E-04	7.3E-04	3.2E-03	1.4E-06	6.1E-06	---	---	---	---	7.7E-07	3.4E-06	7.7E-04	3.4E-03		
T01	4E	5.1E-04	2.4E-03	5.1E-04	2.4E-03	---	---	1.7E-03	0.01	5.1E-04	2.4E-03	5.1E-04	2.4E-03	5.1E-04	2.4E-03	---	---	4.3E-03	0.02		
TLO	5E	---	0.01	---	0.01	---	---	---	0.03	---	0.01	---	0.01	---	0.01	---	---	---	0.06		
SSM	6E	---	7.7E-03	---	7.7E-03	---	---	---	0.03	---	7.7E-03	---	7.7E-03	---	7.7E-03	---	---	---	0.05		
RPC	7E	1.0E-03	4.5E-03	1.0E-03	4.5E-03	4.2E-03	0.02	1.0E-03	4.5E-03	1.0E-03	4.5E-03	1.0E-03	4.5E-03	1.0E-03	4.5E-03	---	---	0.01	0.05		
TOTAL POINT:		0.15	0.65	0.12	0.52	0.27	1.18	0.09	0.46	0.70	3.09	0.12	0.54	1.24	5.45	0.07	0.30	2.53	11.17		
FUG-G	1F	8.1E-03	3.6E-02	8.1E-03	3.6E-02	---	---	0.01	0.04	8.1E-03	3.6E-02	8.1E-03	3.6E-02	8.1E-03	3.6E-02	---	---	0.01	0.06		
FUG-W	2F	0.06	0.24	0.06	0.24	---	---	0.19	0.81	0.06	0.24	0.06	0.24	0.06	0.24	---	---	0.46	2.04		
TOTAL FUG:		0.06	0.28	0.06	0.28	---	---	0.20	0.86	0.06	0.28	0.06	0.28	0.06	0.28	---	---	0.48	2.10		
TOTAL FACILITY:		0.21	0.93	0.18	0.80	0.27	1.18	0.29	1.32	0.77	3.37	0.18	0.82	1.30	5.73	0.07	0.30	3.01	13.27		
NSR THRESHOLD:		2 lb/hr <u>OR</u> 0.5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 0.5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy			
VOP THRESHOLD:		---		10		---		10		---		10		---		10		---		25	

- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr.
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 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), 2,2,4-TMP (i-octane), acetaldehyde, acrolein, and methanol.

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Potential to Emit (PTE) - GREENHOUSE GASES (GHG) - CONTROLLED

Unit ID	Point ID	Control ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 53.06		kg/MMBtu: 1.00E-03		kg/MMBtu: 1.00E-04		TOTAL CO2e tpy
						GWP: CO2 tpy	CO2e tpy	GWP: CH4 tpy	CO2e tpy	GWP: N2O tpy	CO2e tpy	
CE-1	1E	na	Compressor Engine - Ajax DPC-2802LE	3.53	8,760	1,811	1,811	20	492	3.4E-03	1	2,305
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	---	8,760	---	---	62	1,558	---	---	1,558
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.42	8,760	214	214	4.1E-03	0.1	3.9E-03	1	216
T01	4E	na	Storage Tank - Produced Water	---	8,760	3.4E-03	3.4E-03	3.0E-01	7.5	---	---	7
TLO	5E	na	Truck Load-Out - Produced Water	---	---	---	---	---	---	---	---	---
SSM	6E	na	Startup/Shutdown/Maintenance	---	---	0.13	0.13	14	347.9	---	---	348
RPC	7E	na	Rod Packing/Crankcase Leaks	---	8,760	29	29	7	167	---	---	196
TOTAL POINT SOURCE EMISSIONS:						2,055	2,055	103	2,573	7E-03	2	4,630

NSR/PSD Threshold: (- OR - - OR -) - AND -
 Title V Major Source Threshold:

FUG-G	1F	na	Piping and Equipment Fugitives - Gas	---	8,760	0.2	0.2	18	446	---	---	446
FUG-W	2F		Piping and Equipment Fugitives - Condensate	---	8,761	0.08	0.08	2.44	61	---	---	61
TOTAL FUGITIVE EMISSIONS:						---	---	20	507	---	---	507

TOTAL FACILITY-WIDE PTE:

- 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 - High Heat Value (HHV) = Low Heat Value (LHV) / 0.90.
- 6 - GHG NSR/PSD Thresholds and Title V Major Source Thresholds are applicable only if other regulated air pollutants exceed the corresponding Thresholds.

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

POTENTIAL-TO-EMIT (PTE) – PRE-CONTROLLED

Unit ID	Point ID	Control ID	Description	Site Rating	NOX		CO		VOC		XYLENE		TOTAL HAP	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	1E	na	Compressor Engine - Ajax DPC-2802LE	400 bhp	1.76	7.72	1.06	4.63	0.97	4.25	9.5E-04	4.1E-03	0.35	1.53
RSV-1	2E	na	TEG Dehydrator - Flash Tank & Still Vent	17.0 MMscfd	---	---	---	---	6.58	28.82	---	---	2.16	9.46
RBV-1	3E	na	TEG Dehydrator - Reboiler	0.38 MMBtu/hr	0.04	0.18	0.03	0.15	2.3E-03	0.01	1.24	5.42	7.7E-04	3.4E-03
T01	4E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.12	5.1E-04	2.4E-03	4.3E-03	0.02
TLO	5E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.26	---	0.01	---	0.06
SSM	6E	na	Startup/Shutdown/Maintenance	400 bhp	---	---	---	---	---	2.39	---	7.7E-03	---	0.05
RPC	7E	na	Rod Packing/Crankcase Leaks	400 bhp	---	---	---	---	0.26	1.16	1.0E-03	4.5E-03	0.01	0.05
TOTAL POINT SOURCE EMISSIONS:					1.80	7.90	1.09	4.78	7.83	37.00	1.24	5.45	2.53	11.17

WV NSR THRESHOLD:

6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy
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TVOP THRESHOLD:

---	100	---	100	---	100	---	100
-----	-----	-----	-----	-----	-----	-----	-----

FUG-G	1F	na	Piping and Equipment Fugitives - Gas	1,737 units	---	---	---	---	0.76	3.33	8.1E-03	3.6E-02	0.01	0.06
FUG-W	2F	na	Piping and Equipment Fugitives - Condensate	873 units	---	---	---	---	1.86	8.14	0.06	0.24	0.46	2.04
TOTAL FUGITIVE EMISSIONS:					---	---	---	---	2.62	11.47	0.06	0.28	0.48	2.10

TOTAL FACILITY-WIDE EMISSIONS:

1.80	7.90	1.09	4.78	10.45	48.48	1.30	5.73	3.01	13.27
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- Notes:
- 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr.
 - 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 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment N - Supporting Emissions Calculations

Compressor Engine - Ajax DPC-2802LE

Unit ID (Point ID)	Description	Reference	Pollutant	Pre-Controlled Emissions			Control Efficiency	Controlled Emissions		
				g/bhp-hr	lb/hr	tpy		g/bhp-hr	lb/hr	tpy
CE-1 (1E)	Ajax DPC-2802LE 2SLB 400 bhp (site rated) 440 rpm 2,826 in3/cyl Commenced Construction Prior to 07/01/08 NSPS JJJJ - NO NESHAP ZZZZ - YES 8,760 hr/yr 7,800 Btu/bhp-hr (LHV) 8,837 Btu/bhp-hr (HHV) 3.12 MMBtu/hr (LHV) 3.53 MMBtu/hr (HHV) 27,331 MMBtu/yr (LHV) 3,391 scf/hr 29.71 MMscf/yr 920 Btu/scf (LHV) 1,020 Btu/scf (HHV)	Vendor Specs	NOx	2.00	1.76	7.72	0.0%	2.00	1.76	7.72
		Vendor Specs	CO	1.20	1.06	4.63	0.0%	1.20	1.06	4.63
		NMHC+CH4	THC	6.30	5.56	24.33	0.0%	6.30	5.56	24.33
		Estimate	NMHC	1.20	1.06	4.63	0.0%	1.20	1.06	4.63
		Vendor Specs	NMNEHC	0.80	0.71	3.09	0.0%	0.80	0.71	3.09
		NMNEHC+HCHO	VOC	1.10	0.97	4.25	0.0%	1.10	0.97	4.25
		AP-42 Table 3.2-2	SO2	2.4E-03	2.1E-03	0.01	0.0%	2.4E-03	2.1E-03	0.01
		AP-42 Table 3.2-2	PM10/2.5	0.19	0.17	0.75	0.0%	0.19	0.17	0.75
		AP-42 Table 3.2-2	Benzene	0.01	0.01	0.03	0.0%	0.01	0.01	0.03
		AP-42 Table 3.2-2	Ethylbenzene	4.3E-04	3.8E-04	1.7E-03	0.0%	4.3E-04	3.8E-04	1.7E-03
		Vendor Specs	HCHO	0.30	0.26	1.16	0.0%	0.30	0.26	1.16
		AP-42 Table 3.2-2	n-Hexane	1.8E-03	1.6E-03	0.01	0.0%	1.8E-03	1.6E-03	6.9E-03
		AP-42 Table 3.2-2	Toluene	3.9E-03	3.4E-03	0.01	0.0%	3.9E-03	3.4E-03	0.01
		AP-42 Table 3.2-2	2,2,4-TMP	3.4E-03	3.0E-03	0.01	0.0%	3.4E-03	3.0E-03	0.01
		AP-42 Table 3.2-2	Xylenes	1.1E-03	9.5E-04	4.1E-03	0.0%	1.1E-03	9.5E-04	4.1E-03
		AP-42 Table 3.2-2	Other HAP	0.08	0.07	0.30	0.0%	0.08	0.07	0.30
			Sum	Total HAP	0.40	0.35	1.53	0.0%	0.40	0.35
	40CFR98 - Table C-1	CO2	469	414	1,811	0.0%	469	414	1,811	
	Vendor Specs	CH4	5.1	4	20	0.0%	5	4	20	
	40CFR98 - Table C-2	N2O	8.8E-04	7.8E-04	3.4E-03	0.0%	8.8E-04	7.8E-04	3.4E-03	
	40CFR98 - Table A-1	CO2e	597	526	2,305	0.0%	597	526	2,305	

- 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.

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment N - Supporting Emissions Calculations

TEG Dehydrator - Flash Tank & Still Vent

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Control Emissions		Control %	Controlled Emissions	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
RSV-1 (2E)	Dehydrator 01 (Flash Tank + Still Vent)	See BLR-01	NOX	---	---	---	---	---	---	---
		See BLR-01	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	THC	---	---	25.83	113.15	---	25.83	113.15
		GRI-GLYCalc 4.0	NMHC	---	---	11.60	50.82	---	11.60	50.82
		GRI-GLYCalc 4.0	NMNEHC	---	---	6.58	28.82	---	6.58	28.82
		GRI-GLYCalc 4.0	VOC	---	---	6.58	28.82	---	6.58	28.82
		See BLR-01	SO2	---	---	---	---	---	---	---
		See BLR-01	PM10/2.5	---	---	---	---	---	---	---
	17.0 MMscfd	GRI-GLYCalc 4.0	Benzene	---	---	0.14	0.60	---	0.14	0.60
		GRI-GLYCalc 4.0	Ethylbenzene	---	---	0.11	0.50	---	0.11	0.50
		See BLR-01	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	---	---	0.09	0.39	---	0.09	0.39
	8,760 hr/yr	GRI-GLYCalc 4.0	Toluene	---	---	0.70	3.05	---	0.70	3.05
		GRI-GLYCalc 4.0	2,2,4-TMP	---	---	0.11	0.50	---	0.11	0.50
		GRI-GLYCalc 4.0	Xylenes	---	---	1.24	5.42	---	1.24	5.42
		GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
	0.71 MMscf/hr 6,205 MMscf/yr	GRI-GLYCalc 4.0	Total HAP	---	---	2.16	9.46	---	2.16	9.46
		See BLR-01	CO2	---	---	---	---	---	---	---
	NESHAP HH - Exempt	GRI-GLYCalc 4.0	CH4	---	---	14	62	---	14	62
		See BLR-01	N2O	---	---	---	---	---	---	---
40CFR98 - Table A-1		CO2e	---	---	356	1,558	---	356	1,558	

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

17.0 MMscfd Dehydrator 01	GRI-GLYCalc 4.0* (Flash Tank + Still Vent)	Worst-Case (With 20% Margin)	*Dehydrator Operating Parameters (See Attachment N)			
THC	94.29 tpy	113.15 tpy	Flow Rate:	17.0 MMscfd	Flash Tank Temperature:	165 oF
NMHC	42.35 tpy	50.82 tpy	Gas Analysis:	Attachment H	Flash Tank Pressure:	50 psig
NMNEHC = VOC	24.02 tpy	28.82 tpy	Wet Gas Temperature:	70 oF	Flash Tank Control:	na - 50% Recycle
Benzene	0.50 tpy	0.60 tpy	Wet Gas Pressure:	1,000 psig	Stripping Gas:	na
Ethylbenzene*	0.00 tpy	0.50 tpy	Wet Gas Water Content:	Saturated	Stripping Gas Flow Rate:	na
HCHO	--- tpy	--- tpy	Dry Gas Water Content:	7.0 lb H2O/MMscf	Condenser Temperature:	na
n-Hexane	0.32 tpy	0.39 tpy	Lean Glycol Water Content:	1.5 wt% H2O	Condenser Pressure:	na
Toluene	2.54 tpy	3.05 tpy	Glycol Circulation Rate:	1.50 gpm	Combustor Temperature:	na
2,2,4-TMP (i-Octane)*	0.00 tpy	0.50 tpy	Glycol Pump:	Gas Injection	Combustor Excess O2:	na
Xylenes	4.52 tpy	5.42 tpy	Glycol Pump:	Kimray 9015PV	Combustor Efficiency:	na
Other HAP	--- tpy	--- tpy				
Total HAP	7.88 tpy	9.46 tpy				
CH4	52 tpy	62 tpy				

* Worst-case ethylbenzene and 2,2,4-TMP emissions set at 0.5 TPY

Williams Ohio Valley Midstream LLC
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Attachment N - Supporting Emissions Calculations

TEG Dehydrator - Reboiler

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions		Control Efficiency %	Controlled Emissions		
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy	
RBV-1 (3E)	TRIETHYLENE GLYCOL (TEG) REBOILER 0.375 MMBtu/hr (LHV) 0.42 MMBtu/hr (HHV) 8,760 hr/yr 920 Btu/scf (LHV) 1,020 Btu/scf (HHV) 3,285 MMBtu/yr (LHV) 3,642 MMBtu/yr (HHV) 408 scf/hr 3.57 MMscf/yr	EPA AP-42 Table 1.4-1	NOX	100.00	0.10	0.04	0.18	---	0.04	0.18	
		EPA AP-42 Table 1.4-1	CO	84.00	0.08	0.03	0.15	---	0.03	0.15	
		EPA AP-42 Table 1.4-2	THC	11.00	0.01	4.5E-03	0.02	---	4.5E-03	0.02	
		EPA AP-42 Table 1.4-2	NMHC	8.70	0.01	3.5E-03	0.02	---	3.5E-03	0.02	
		EPA AP-42 Table 1.4-2	NMNEHC	5.60	0.01	2.3E-03	0.01	---	2.3E-03	0.01	
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	2.3E-03	0.01	---	2.3E-03	0.01	
		EPA AP-42 Table 1.4-2	SO2	0.60	5.9E-04	2.4E-04	1.1E-03	---	2.4E-04	1.1E-03	
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	3.1E-03	0.01	---	3.1E-03	0.01	
		EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.1E-06	8.6E-07	3.7E-06	---	8.6E-07	3.7E-06	
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---	
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.4E-05	3.1E-05	1.3E-04	---	3.1E-05	1.3E-04	
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.8E-03	7.3E-04	3.2E-03	---	7.3E-04	3.2E-03	
		EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.3E-06	1.4E-06	6.1E-06	---	1.4E-06	6.1E-06	
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	---	---	---	
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---	
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.9E-06	7.7E-07	3.4E-06	---	7.7E-07	3.4E-06	
			SUM	Tot HAP	1.88	1.8E-03	7.7E-04	3.4E-03	---	7.7E-04	3.4E-03
			EPA AP-42 Table 1.4-3	CO2	120,000	118	49	214	---	49	214
	EPA AP-42 Table 1.4-3	CH4	2.30	2.3E-03	9.4E-04	4.1E-03	---	9.4E-04	4.1E-03		
	EPA AP-42 Table 1.4-3	N2O	2.20	2.2E-03	9.0E-04	3.9E-03	---	9.0E-04	3.9E-03		
	40CFR98 - Table A-1	CO2e	120,713	118	49	216	---	49	216		

- Notes:
- 1 - 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.
 - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
 - 3 - HCHO is Formaldehyde; Other HAP includes Acetaldehyde, Acrolein, 1,3-Butadiene, Methanol, Methylene Chloride, and traces of other HAP.
 - 4 - Emission factors in AP-42 are NOT EPA-recommended emission limits. Because emission factors essentially represent an average of a range of emission rates, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

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		n-Hexane		BTEX, TMP-ea		Total HAP		CO2		CH4		CO2e	
							100.00 Wgt%	lb/hr tpy	10.00 Wgt%	lb/hr tpy	3.00 Wgt%	lb/hr tpy	25.00 Wgt%	lb/hr tpy	1.00 Wgt%	lb/hr tpy	30.00 Wgt%	lb/hr tpy	GWP = 25	lb/hr tpy
T01 (4E)	Prod H2O	210	12.0	2,520	0.039 lb/bbl	0.020 lb/bbl	0.02	0.07	1.7E-03	0.01	5.1E-04	2.2E-03	4.3E-03	0.02	1.7E-04	7.5E-04	0.01	0.02	0.1	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		n-Hexane		BTEX, TMP-ea		Total HAP		CO2		CH4		CO2e	
							7,200 lb/MMcf	lb/hr tpy	90 lb/MMcf	lb/hr tpy	28 lb/MMcf	lb/hr tpy	140 lb/MMcf	lb/hr tpy	400 lb/MMcf	lb/hr tpy	42,000 lb/MMcf	lb/hr tpy	GWP = 25	lb/hr tpy
T01 (4E)	Prod H2O	210	12.0	2,520	1,100 scf	13,200 scf	---	0.05	---	5.9E-04	---	1.8E-04	---	9.2E-04	---	2.6E-03	---	0.28	---	7
TOTAL VOLUME:		210	12.0	2,520																

TOTAL EMISSIONS:	0.02	0.12	1.7E-03	0.01	5.1E-04	2.4E-03	4.3E-03	0.02	1.7E-04	3.4E-03	0.01	0.30	0.1	7
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- 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 Condensate 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. An option to use blanket gas on the produced water tank is requested.

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment N - Supporting Emissions Calculations

Truck Load-Out - Produced Water

Unit ID (Point ID)	Description	S	P	MW	T	CE	L _L	T-Put	VOC		n-Hexane		BTEX, TMP (ea)		Total HAP	
		sat. fac.	psia	lb/lb-mol	°R	%	lb/Mgal	Mgal/yr	AP-42 Sect 5.2 lb/hr	tpy	10.00% of VOC lb/hr	tpy	3.00% of VOC lb/hr	tpy	25.0% of VOC lb/hr	tpy
TLO (5E)	Produced Water	1.45	1.5	92	510	---	4.90	106	14.39	0.26	1.44	0.03	0.43	0.01	3.60	0.06
TOTAL TLO EMISSIONS:								106	14.39	0.26	1.44	0.03	0.43	0.01	3.60	0.06

Notes: 1 - Emission factors and formulas are from AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids":

$$L_L = 12.46 \times S \times P \times MW / T \times (1 - CE)$$

- where:
- L_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. Estimated at 1.5 psia.
 - MW = molecular weight of vapors, lb/lb-mol. (Assumed MW of toluene as it has similar RVP and density as anticipated liquids.)
 - T = Temperature of bulk liquid loaded, °R = °F + 460. (Conservatively assumed 50 °F.)
 - CE = Overall emission reduction efficiency (collection efficiency x control efficiency).

5 - Assume 50 gpm load-out results in: 36 hr/yr.

6 - **Emission factors in AP-42 are NOT EPA-recommended emission limits.** Because emission factors essentially represent an average of a range of emission rates, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

STARCOVIC COMPRESSOR STATION

Application for 45CSR13 NSR Modification Permit

Attachment N - Supporting Emissions Calculations

Startup/Shutdown/Maintenance

Unit ID (Point ID)	Description	No of Compressor 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 7,200 lb/MMscf tpy	n-Hexane 90 lb/MMscf tpy	BTEX, TMP (ea) 23 lb/MMscf tpy	Total HAP 140 lb/MMscf tpy	CO2 400 lb/MMscf tpy	CH4 42,000 lb/MMscf tpy	CO2e GWP = 25 tpy
SSM (6E)	a. Cold Start (Engine)	1	400	208	700	2,486	0.15	0.52	0.01	1.7E-03	0.01	0.03	3	76
	b. Blowdown (Recip Comp)			208			0.52	1.86	0.02	6.0E-03	0.04	0.10	11	272

TOTAL FACILITY-WIDE SSM EMISSIONS:

2.39	0.03	7.7E-03	0.05	0.13	14	348
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- Notes: 1 - SSM Emissions are the sum of:
- a. Unburned fuel resulting from "cold-start" of idle gas-fired engines; and
 - b. Natural gas that is purged (aka blowdown) from the compressors and associated piping and equipment.
- 2 - CM-01 and CM-02 thru CM-07 are gas compressors driven by electric motors. CM-01 is the Columbia compressor, CM-02 thru CM-07 are the residue gas compressors.
- 3 - 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

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

Pollutant	Inlet Gas Analysis	Estimated
Carbon Dioxide	260 lb/MMscf	400 lb/MMscf
Methane	34,652 lb/MMscf	42,000 lb/MMscf
VOC (Propane)	5,993 lb/MMscf	7,200 lb/MMscf
n-Hexane	75 lb/MMscf	90 lb/MMscf
BTEX, TMP (ea)	16 lb/MMscf	23 lb/MMscf
Total HAP:	93 lb/MMscf	140 lb/MMscf

5 - Emission estimates are conservatively based on:

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

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
 Application for 45CSR13 NSR Modification Permit
Attachment N - Supporting Emissions Calculations

Rod Packing/Crankcase Leaks

Unit ID (Point ID)	Unit Description	No. of Recip Compress- ors	Cyl per Recip Compressor	scfh per Cyl	Contingency	Total Leak Rate MMscf/yr	VOC		HCHO		n-Hex,BTEX (Ea)		Total HAP		CO2		CH4		CO2e	
							7,200		na		23		140		400		42,000		1,050,400	
							lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy
RPC (7E)	Rod Packing - CE-1	1	2	15	15%	0.30	0.25	1.09	na	na	8.1E-04	3.5E-03	4.8E-03	0.02	0.01	0.06	1	6	36	159

Unit ID (Point ID)	Unit Description	Total Recip Horsepower (bhp)	Leak Rate 0.50 scf/bhp-hr MMscf/yr	Safety Factor	VOC		HCHO		n-Hex,BTEX (Ea)		Total HAP		CO2		CH4		CO2e	
					31.07		8.47		0.46		11.21		13,243		144		16,844	
					lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy	lb/MMscf	tpy
RPC (7E)	Crankcase Emissions	400	1.75	250%	0.02	0.07	4.2E-03	0.02	2.3E-04	1.0E-03	0.01	0.02	6.6	29	0.07	0.32	8.4	37

Total RPC Emissions:

VOC		HCHO		n-Hex,BTEX (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
0.26	1.16	4.2E-03	0.02	1.0E-03	4.5E-03	0.01	0.05	6.6	29	2	7	45	196

Notes:

1 - Misc. equipment leaks 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. It also includes the crankcase emissions from reciprocating engines.

2 - 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	260 lb/MMscf	400 lb/MMscf
CH4	34,652 lb/MMscf	42,000 lb/MMscf
VOC	5,993 lb/MMscf	7,200 lb/MMscf
n-Hex, BTEX, TMP (ea)	16 lb/MMscf	23 lb/MMscf
Total HAP	93 lb/MMscf	140 lb/MMscf

3 - Estimates of Recip Compressor Leaks are based on vendor data w/ an appropriate contingency.

4 - 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".

5 - Crankcase emissions are estimated as follows:

(Data from Ajax DPC-2802LE Data Sheet and Emissions Calculation Spreadsheet.)

Tot Eng Exhaust (TEEx) (Vol) 1,439 acf/min 274 MMscf/yr TEEx*

Pollutant	Ajax-2802LE PTE	Crankcase Emission Factor**
Crankcase THC emissions (Mass)	24.33 tpy THC	177.93 lb THC / MMscf TEEx
Crankcase VOC emissions (Mass)	4.25 tpy VOC	31.07 lb VOC / MMscf TEEx
Crankcase HCHO emissions (Mass)	1.16 tpy HCHO	8.47 lb HCHO / MMscf TEEx
Crankcase n-Hex, BTEX, TMP (ea) (Mass)	0.06 tpy BTEX	0.46 lb BTEX / MMscf TEEx
Crankcase HAP (tot) emissions (Mass)	1.53 tpy HAP	11.21 lb HAP / MMscf TEEx
Crankcase CO2 emissions (Mass)	1,811 tpy CO2	13,243 lb CO2 / MMscf TEEx
Crankcase CH4 emissions (Mass)	20 tpy CH4	144 lb CH4 / MMscf TEEx
Crankcase CO2e emissions (Mass)	2,305 tpy CO2e	16,852 lb CO2e / MMscf TEEx

* Conversion from acf/min to scf/yr based 1,000 oF exhaust temp, and 68 oF std temp.

** Crankcase EmFact = PTE (tpy) from Ajax-2802LE ÷ Tot Engine Exhaust (TEEx) (MMsf/yr).

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
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Attachment N - Supporting Emissions Calculations

Piping and Equipment Fugitives - Gas & Condensate

Unit ID (Point ID)	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC)		VOC 13.99 Wgt%		n-Hexane 0.17 Wgt%		BTEX, TMP-ea 0.15 Wgt%		Total HAP 0.27 Wgt%		CO2 0.78 Wgt%		CH4 75.00 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	0.54	2.34	0.01	0.03	5.7E-03	0.03	0.01	0.05	0.03	0.13	2.87	12.56	72	314
		Pump Seals	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Other	45	0.01940	0%	0.87	3.82	0.12	0.54	1.5E-03	0.01	1.3E-03	5.7E-03	2.4E-03	0.01	6.8E-03	0.03	0.65	2.87	16	72
		Connectors	1,106	0.00044	0%	0.49	2.13	0.07	0.30	8.5E-04	3.7E-03	7.3E-04	3.2E-03	1.3E-03	0.01	3.8E-03	0.02	0.37	1.60	9	40
		Flanges	180	0.00086	0%	0.15	0.68	0.02	0.09	2.7E-04	1.2E-03	2.3E-04	1.0E-03	4.2E-04	1.8E-03	1.2E-03	5.3E-03	0.12	0.51	3	13
		Open-ended	21	0.00441	0%	0.09	0.41	0.01	0.06	1.6E-04	7.1E-04	1.4E-04	6.1E-04	2.5E-04	1.1E-03	7.2E-04	3.2E-03	0.07	0.30	2	8
			1,737	Pre-Control:		5.43	23.79	0.76	3.33	0.01	0.04	8.1E-03	3.6E-02	0.01	0.06	0.04	0.18	4.07	17.85	102	446
				Controlled:		5.43	23.79	0.76	3.33	0.01	0.04	8.1E-03	3.6E-02	0.01	0.06	0.04	0.18	4.07	17.85	102	446

Unit ID (Point ID)	Description	Component (Unit) Type (Condensate)	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 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	lb/hr	tpy
FUG-W (2F)	Process Piping Fugitives (Condensate)	Valves	193	0.00551	0%	1.06	4.65	1.06	4.65	0.11	0.47	0.03	0.14	0.27	1.16	0.01	0.05	0.32	1.40	7.98	35
		Pump Seals	4	0.02866	0%	0.11	0.50	0.11	0.50	0.01	0.05	3.4E-03	0.02	0.03	0.13	1.1E-03	0.01	0.03	0.15	0.86	3.77
		Other	23	0.01653	0%	0.37	1.63	0.37	1.63	0.04	0.16	0.01	0.05	0.09	4.1E-01	3.7E-03	0.02	0.11	0.49	3	12
		Connectors	553	0.00046	0%	0.26	1.12	0.26	1.12	0.03	0.11	7.7E-03	0.03	0.06	0.28	2.6E-03	0.01	0.08	0.34	2	8
		Flanges	90	0.00024	0%	0.02	0.10	0.02	0.10	2.2E-03	9.6E-03	6.5E-04	2.9E-03	5.5E-03	0.02	2.2E-04	9.6E-04	6.5E-03	0.03	0.16	0.72
		Open-ended	11	0.00309	0%	0.03	0.14	0.03	0.14	3.2E-03	0.01	9.7E-04	4.3E-03	8.1E-03	0.04	3.2E-04	1.4E-03	9.7E-03	0.04	0.24	1.07
			873	Pre-Control:		1.86	8.14	1.86	8.14	0.19	0.81	5.6E-02	0.24	0.46	2.04	0.02	0.08	0.56	2.44	14	61
				Controlled:		1.86	8.14	1.86	8.14	0.19	0.81	0.06	0.24	0.46	2.04	0.02	0.08	0.56	2.44	14	61

TOTAL PRE-CONTROL FUGITIVE EMISSIONS:	7.29	31.94	2.62	11.47	0.20	0.86	0.06	0.28	0.48	2.10	0.06	0.27	4.63	20.29	116	507
TOTAL CONTROLLED FUGITIVE EMISSIONS:	7.29	31.94	2.62	11.47	0.20	0.86	0.06	0.28	0.48	2.10	0.06	0.27	4.63	20.29	116	507

Notes: 1 - Assumed 8,760 hours per year of fugitive emissions.

2 - Gas and Condensate fugitive emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

3 - Components in Gas Service are based on GRI-HAPCalc estimates, plus a

50%	margin
50%	reduction

4 - Components in Light Liquid Service are based on Gas Component counts, times a

5 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.

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

TABLE 2.4 O&G PROD (AVE)	Gas		Condensate	
	kg/hr	lb/hr	kg/hr	lb/hr
Valves	4.5E-03	0.00992	2.5E-03	0.00551
Pump Seals	na	na	1.3E-02	0.02866
Others	8.8E-03	0.01940	7.5E-03	0.01653
Connectors	2.0E-04	0.00044	2.1E-04	0.00046
Flanges	3.9E-04	0.00086	1.1E-04	0.00024
Open-Ended Lines	2.0E-03	0.00441	1.4E-03	0.00309

Pollutant	Gas		Condensate	
	Analysis	Estimated	Analysis	Estimated
Carbon Dioxide	0.51 Wgt%	0.78 Wgt%	--- Wgt%	--- Wgt%
Methane	67.35 Wgt%	75.00 Wgt%	--- Wgt%	--- Wgt%
VOC	11.65 Wgt%	13.99 Wgt%	--- Wgt%	100.00 Wgt%
n-Hexane	0.15 Wgt%	0.17 Wgt%	--- Wgt%	10.00 Wgt%
BTEX, TMP-ea	0.02 Wgt%	0.15 Wgt%	--- Wgt%	3.00 Wgt%
Total HAP	0.18 Wgt%	0.27 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 ENGINES			GAS-FIRED TURBINES		
		AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			AP-42 Table 3.1-1; 3.1-2a; 3.1-3 04/00		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix# lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	3.17E+00	4.08E+00	2.21E+00	3.20E-01	1.30E-01	9.90E-02
	CO (≥ 90% Load)	3.86E-01	3.17E-01	3.72E+00	8.20E-02	3.00E-02	1.50E-02
	THC (TOC)	1.64E+00	1.47E+00	3.58E-01	1.10E-02	1.10E-02	1.10E-02
	NMHC (THC-CH4)	1.90E-01	2.20E-01	1.28E-01	2.40E-03	2.40E-03	2.40E-03
	NMNEHC (NMHC-C2H6)	1.19E-01	1.15E-01	5.76E-02	2.10E-03	2.10E-03	2.10E-03
	VOC	1.20E-01	1.18E-01	2.96E-02	2.10E-03	2.10E-03	2.10E-03
	SO2*** (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04
	PM10/2.5 (Filter+Cond)	4.83E-02	9.99E-03	1.94E-02	6.60E-03	6.60E-03	6.60E-03
HAPS	Benzene	1.94E-03	4.40E-04	1.58E-03	1.20E-05	1.20E-05	9.10E-07
	Ethylbenzene	1.08E-04	3.97E-05	2.48E-05	3.20E-05	3.20E-05	3.20E-05
	Formaldehyde (HCHO)	5.52E-02	5.28E-02	2.05E-02	7.10E-04	7.10E-04	2.00E-05
	n-Hexane	4.45E-04	1.11E-03	---	---	---	---
	Toluene	9.63E-04	4.08E-04	5.58E-04	1.30E-04	1.30E-04	1.30E-04
	TMP, 2,2,4- (i-Octane)	8.46E-04	2.50E-04	---	---	---	---
	Xylenes	2.68E-04	1.84E-04	1.95E-04	6.40E-05	6.40E-05	6.40E-05
	Other HAPs	1.96E-02	1.69E-02	9.42E-03	1.06E-04	1.06E-04	1.06E-04
GHG	CO2**** (GWP=1)	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
	CH4 (GWP=25)	1.45E+00	1.25E+00	2.30E-01	8.60E-03	8.60E-03	8.60E-03
	N2O (GWP=298)	2.20E-04	2.20E-04	2.20E-04	3.00E-03	3.00E-03	3.00E-03
	CO2e	1.53E+02	1.48E+02	1.23E+02	1.18E+02	1.18E+02	1.18E+02

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

Pollutant		GAS-FIRED EXTERNAL COMBUSTION			FLARES	DIESEL ENGINES
		AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			13.5-1 01/95	3.3-1; 3.3-2 10/96
		Uncontrolled lb/MMBtu	LoNOX Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	(Combustion) lb/MMBtu	Uncontrolled lb/MMBtu
CRITERIA	NOX	9.80E-02	4.90E-02	3.14E-02	6.80E-02	4.41E+00
	CO	8.24E-02	8.24E-02	8.24E-02	3.70E-01	9.50E-01
	THC (TOC)	1.08E-02	1.08E-02	1.08E-02	1.40E-01	3.60E-01
	NMHC (THC-CH4)	8.53E-03	8.53E-03	8.53E-03	1.38E-01	3.53E-01
	NMNEHC (NMHC-C2H6)	5.49E-03	5.49E-03	5.49E-03	5.49E-03	3.50E-01
	VOC	5.56E-03	5.56E-03	5.56E-03	5.56E-03	3.60E-01
	SO2 (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	5.88E-04	2.90E-01
	PM10/2.5 (Filter+Condense)	7.45E-03	7.45E-03	7.45E-03	7.45E-03	3.10E-01
HAPS	Benzene	2.06E-06	2.06E-06	2.06E-06	2.06E-06	9.33E-04
	Ethylbenzene	---	---	---	---	---
	HCHO (Formaldehyde)	7.35E-05	7.35E-05	7.35E-05	7.35E-05	1.18E-03
	n-Hexane	1.76E-03	1.76E-03	1.76E-03	1.76E-03	---
	Toluene	3.33E-06	3.33E-06	3.33E-06	3.33E-06	4.09E-04
	2,2,4-TMP (i-Octane)	---	---	---	---	---
	Xylenes	---	---	---	---	2.85E-04
	Other HAPs	1.86E-06	1.86E-06	1.86E-06	1.86E-06	1.05E-03
GHG	CO2 (GWP=1)	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.64E+02
	CH4 (GWP=25)	2.25E-03	2.25E-03	2.25E-03	2.25E-03	6.61E-03
	N2O (GWP=298)	2.16E-03	6.27E-04	6.27E-04	2.16E-03	1.32E-03
	CO2e	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.65E+02

40 CFR 98 - DEFAULT EMISSION FACTORS				
Fuel Type	Table C-1 to Subpart C of Part 98		Table C-2 to Subpart C of Part 98	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	1.61E+02	6.61E-03	1.32E-03
Natural Gas	1,026 Btu/scf	1.17E+02	2.20E-03	2.20E-04

Global Warming Potential (100 Yr) (GWP)		
Table A-1 to Subpart A of Part 98		
CO2	CH4*	N2O#
1	25	298

#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 gal
1.0 cf H2O	=	62.371 gal
1.0 m	=	3.281 gal
1.0 km	=	0.621 gal
1.0 acre	=	43560.174 gal
1.0 °F	=	(°C*9/5)+32
1.0 °R	=	°F+459.67
1.0 %	=	10,000 ppm
UGC (stp)	=	379.48 scf/lb-mol

*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 SO2 (2,000 gr/MMscf).

****Assumes 99.5% conversion of fuel carbon to CO2 for natural gas.

Case Name: Starcovic TEG Dehydrator

File Name: C:\projects2\wfs\OVM\Starcovic\R13\Starcovic - 17 MMscfd TEG Dehydrator.ddf

Date: March 24, 2015

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1536	3.686	0.6726
Ethane	0.1660	3.984	0.7271
Propane	0.1300	3.119	0.5692
Isobutane	0.0347	0.833	0.1520
n-Butane	0.0723	1.735	0.3166
Isopentane	0.0242	0.580	0.1058
n-Pentane	0.0242	0.581	0.1060
n-Hexane	0.0176	0.424	0.0773
Cyclohexane	0.0469	1.126	0.2056
Other Hexanes	0.0250	0.601	0.1096
Heptanes	0.0609	1.462	0.2667
Methylcyclohexane	0.0026	0.064	0.0116
Benzene	0.1009	2.421	0.4419
Toluene	0.5312	12.748	2.3265
Xylenes	0.9903	23.767	4.3374
C8+ Heavies	0.2657	6.376	1.1636
Total Emissions	2.6460	63.504	11.5895
Total Hydrocarbon Emissions	2.6460	63.504	11.5895
Total VOC Emissions	2.3264	55.835	10.1898
Total HAP Emissions	1.6400	39.359	7.1831
Total BTEX Emissions	1.6223	38.936	7.1058

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.7049	280.919	51.2677
Ethane	4.0196	96.470	17.6057
Propane	1.5543	37.303	6.8079
Isobutane	0.2968	7.124	1.3001
n-Butane	0.4905	11.773	2.1486
Isopentane	0.1547	3.713	0.6776
n-Pentane	0.1276	3.062	0.5588
n-Hexane	0.0557	1.336	0.2439
Cyclohexane	0.0386	0.926	0.1690
Other Hexanes	0.1032	2.476	0.4519
Heptanes	0.1017	2.441	0.4455
Methylcyclohexane	0.0018	0.043	0.0079
Benzene	0.0135	0.324	0.0591
Toluene	0.0496	1.192	0.2175
Xylenes	0.0411	0.987	0.1801
C8+ Heavies	0.1279	3.068	0.5600
Total Emissions	18.8816	453.158	82.7013
Total Hydrocarbon Emissions	18.8816	453.158	82.7013
Total VOC Emissions	3.1571	75.769	13.8279
Total HAP Emissions	0.1600	3.839	0.7006

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	23.4099	561.837	102.5353
Ethane	8.0391	192.940	35.2115
Propane	3.1086	74.607	13.6157
Isobutane	0.5937	14.248	2.6003
n-Butane	0.9811	23.546	4.2972
Isopentane	0.3094	7.426	1.3552
n-Pentane	0.2552	6.124	1.1176
n-Hexane	0.1114	2.673	0.4877
Cyclohexane	0.0772	1.852	0.3380
Other Hexanes	0.2063	4.952	0.9038
Heptanes	0.2034	4.882	0.8910
Methylcyclohexane	0.0036	0.087	0.0158
Benzene	0.0270	0.648	0.1183
Toluene	0.0993	2.383	0.4349
Xylenes	0.0823	1.974	0.3603
C8+ Heavies	0.2557	6.137	1.1200
Total Emissions	37.7631	906.316	165.4026
Total Hydrocarbon Emissions	37.7631	906.316	165.4026
Total VOC Emissions	6.3141	151.538	27.6558
Total HAP Emissions	0.3199	7.678	1.4012
Total BTEX Emissions	0.2086	5.005	0.9135

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.8585	284.604	51.9403
Ethane	4.1856	100.454	18.3328
Propane	1.6843	40.422	7.3771
Isobutane	0.3315	7.957	1.4521
n-Butane	0.5628	13.508	2.4652
Isopentane	0.1789	4.293	0.7834
n-Pentane	0.1518	3.642	0.6648
n-Hexane	0.0733	1.760	0.3212
Cyclohexane	0.0855	2.053	0.3746
Other Hexanes	0.1282	3.077	0.5615
Heptanes	0.1626	3.903	0.7123
Methylcyclohexane	0.0045	0.107	0.0195
Benzene	0.1144	2.745	0.5010
Toluene	0.5808	13.940	2.5440
Xylenes	1.0314	24.754	4.5176
C8+ Heavies	0.3935	9.444	1.7236
Total Emissions	21.5276	516.662	94.2908
Total Hydrocarbon Emissions	21.5276	516.662	94.2908
Total VOC Emissions	5.4835	131.604	24.0177
Total HAP Emissions	1.7999	43.198	7.8837
Total BTEX Emissions	1.7266	41.439	7.5625

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Starcovic TEG Dehydrator

File Name: C:\projects2\wfs\OVM\Starcovic\R13\Starcovic - 17 MMscfd TEG Dehydrator.ddf

Date: March 24, 2015

DESCRIPTION:

Description: 17 MMscfd TEG Dehydrator
 Starcovic Extended Gas Analysis
 (07-11-2014)
 Wet Gas: 70oF, 1000 psig
 Pump: Gas Injection, 1.5 gpm
 Flash Tank: 165oF, 50 psig, 50% Recycle

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 70.00 deg. F
 Pressure: 1000.00 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
-----	-----
Carbon Dioxide	0.2241
Nitrogen	0.7378
Methane	81.9672
Ethane	12.6209
Propane	3.0055
Isobutane	0.3952
n-Butane	0.5830
Isopentane	0.1525
n-Pentane	0.1112
n-Hexane	0.0329
Cyclohexane	0.0095
Other Hexanes	0.0698
Heptanes	0.0388
Methylcyclohexane	0.0004
Benzene	0.0011
Toluene	0.0033
Xylenes	0.0029
C8+ Heavies	0.0413

DRY GAS:

Flow Rate: 17.0 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

FLASH TANK:

Flash Control: Combustion device
Flash Control Efficiency: 50.00 %
Temperature: 165.0 deg. F
Pressure: 50.0 psig

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Starcovic TEG Dehydrator

File Name: C:\projects2\wfs\OVM\Starcovic\R13\Starcovic - 17 MMscfd TEG Dehydrator.ddf

Date: March 24, 2015

DESCRIPTION:

Description: 17 MMscfd TEG Dehydrator
 Starcovic Extended Gas Analysis
 (07-11-2014)
 Wet Gas: 70oF, 1000 psig
 Pump: Gas Injection, 1.5 gpm
 Flash Tank: 165oF, 50 psig, 50% Recycle

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.1536	3.686	0.6726
Ethane	0.1660	3.984	0.7271
Propane	0.1300	3.119	0.5692
Isobutane	0.0347	0.833	0.1520
n-Butane	0.0723	1.735	0.3166
Isopentane	0.0242	0.580	0.1058
n-Pentane	0.0242	0.581	0.1060
n-Hexane	0.0176	0.424	0.0773
Cyclohexane	0.0469	1.126	0.2056
Other Hexanes	0.0250	0.601	0.1096
Heptanes	0.0609	1.462	0.2667
Methylcyclohexane	0.0026	0.064	0.0116
Benzene	0.1009	2.421	0.4419
Toluene	0.5312	12.748	2.3265
Xylenes	0.9903	23.767	4.3374
C8+ Heavies	0.2657	6.376	1.1636
Total Emissions	2.6460	63.504	11.5895
Total Hydrocarbon Emissions	2.6460	63.504	11.5895
Total VOC Emissions	2.3264	55.835	10.1898
Total HAP Emissions	1.6400	39.359	7.1831
Total BTEX Emissions	1.6223	38.936	7.1058

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.7049	280.919	51.2677
Ethane	4.0196	96.470	17.6057
Propane	1.5543	37.303	6.8079
Isobutane	0.2968	7.124	1.3001
n-Butane	0.4905	11.773	2.1486
Isopentane	0.1547	3.713	0.6776
n-Pentane	0.1276	3.062	0.5588
n-Hexane	0.0557	1.336	0.2439

Cyclohexane	0.0386	0.926	0.1690
Other Hexanes	0.1032	2.476	0.4519
Heptanes	0.1017	2.441	0.4455
Methylcyclohexane	0.0018	0.043	0.0079
Benzene	0.0135	0.324	0.0591
Toluene	0.0496	1.192	0.2175
Xylenes	0.0411	0.987	0.1801
C8+ Heavies	0.1279	3.068	0.5600

Total Emissions	18.8816	453.158	82.7013
Total Hydrocarbon Emissions	18.8816	453.158	82.7013
Total VOC Emissions	3.1571	75.769	13.8279
Total HAP Emissions	0.1600	3.839	0.7006
Total BTEX Emissions	0.1043	2.503	0.4567

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	23.4099	561.837	102.5353
Ethane	8.0391	192.940	35.2115
Propane	3.1086	74.607	13.6157
Isobutane	0.5937	14.248	2.6003
n-Butane	0.9811	23.546	4.2972
Isopentane	0.3094	7.426	1.3552
n-Pentane	0.2552	6.124	1.1176
n-Hexane	0.1114	2.673	0.4877
Cyclohexane	0.0772	1.852	0.3380
Other Hexanes	0.2063	4.952	0.9038
Heptanes	0.2034	4.882	0.8910
Methylcyclohexane	0.0036	0.087	0.0158
Benzene	0.0270	0.648	0.1183
Toluene	0.0993	2.383	0.4349
Xylenes	0.0823	1.974	0.3603
C8+ Heavies	0.2557	6.137	1.1200

Total Emissions	37.7631	906.316	165.4026
Total Hydrocarbon Emissions	37.7631	906.316	165.4026
Total VOC Emissions	6.3141	151.538	27.6558
Total HAP Emissions	0.3199	7.678	1.4012
Total BTEX Emissions	0.2086	5.005	0.9135

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	11.8585	284.604	51.9403
Ethane	4.1856	100.454	18.3328
Propane	1.6843	40.422	7.3771
Isobutane	0.3315	7.957	1.4521
n-Butane	0.5628	13.508	2.4652
Isopentane	0.1789	4.293	0.7834
n-Pentane	0.1518	3.642	0.6648
n-Hexane	0.0733	1.760	0.3212
Cyclohexane	0.0855	2.053	0.3746
Other Hexanes	0.1282	3.077	0.5615
Heptanes	0.1626	3.903	0.7123

Methylcyclohexane	0.0045	0.107	0.0195
Benzene	0.1144	2.745	0.5010
Toluene	0.5808	13.940	2.5440
Xylenes	1.0314	24.754	4.5176
C8+ Heavies	0.3935	9.444	1.7236

Total Emissions	21.5276	516.662	94.2908

Total Hydrocarbon Emissions	21.5276	516.662	94.2908
Total VOC Emissions	5.4835	131.604	24.0177
Total HAP Emissions	1.7999	43.198	7.8837
Total BTEX Emissions	1.7266	41.439	7.5625

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction

Methane	103.2080	51.9403	49.67
Ethane	35.9385	18.3328	48.99
Propane	14.1849	7.3771	47.99
Isobutane	2.7522	1.4521	47.24
n-Butane	4.6138	2.4652	46.57
Isopentane	1.4610	0.7834	46.38
n-Pentane	1.2236	0.6648	45.67
n-Hexane	0.5650	0.3212	43.16
Cyclohexane	0.5436	0.3746	31.09
Other Hexanes	1.0134	0.5615	44.59
Heptanes	1.1578	0.7123	38.48
Methylcyclohexane	0.0274	0.0195	28.82
Benzene	0.5602	0.5010	10.56
Toluene	2.7614	2.5440	7.88
Xylenes	4.6977	4.5176	3.83
C8+ Heavies	2.2836	1.7236	24.52

Total Emissions	176.9921	94.2908	46.73

Total Hydrocarbon Emissions	176.9921	94.2908	46.73
Total VOC Emissions	37.8456	24.0177	36.54
Total HAP Emissions	8.5843	7.8837	8.16
Total BTEX Emissions	8.0193	7.5625	5.70

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: 1.12 lbs. H2O/MMSCF
 Temperature: 70.0 deg. F

Pressure: 1000.0 psig
 Dry Gas Flow Rate: 17.0000 MMSCF/day
 Glycol Losses with Dry Gas: 0.1095 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 23.61 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 5.65 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	4.76%	95.24%
Carbon Dioxide	99.85%	0.15%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.97%	0.03%
Propane	99.96%	0.04%
Isobutane	99.94%	0.06%
n-Butane	99.92%	0.08%
Isopentane	99.92%	0.08%
n-Pentane	99.90%	0.10%
n-Hexane	99.84%	0.16%
Cyclohexane	99.25%	0.75%
Other Hexanes	99.88%	0.12%
Heptanes	99.72%	0.28%
Methylcyclohexane	99.23%	0.77%
Benzene	92.11%	7.89%
Toluene	88.98%	11.02%
Xylenes	81.42%	18.58%
C8+ Heavies	99.69%	0.31%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 50.00 %
 Flash Temperature: 165.0 deg. F
 Flash Pressure: 50.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.19%	0.81%
Carbon Dioxide	5.69%	94.31%
Nitrogen	0.63%	99.37%
Methane	0.65%	99.35%
Ethane	2.02%	97.98%
Propane	4.01%	95.99%
Isobutane	5.52%	94.48%
n-Butane	6.86%	93.14%
Isopentane	7.46%	92.54%
n-Pentane	8.91%	91.09%
n-Hexane	13.96%	86.04%
Cyclohexane	39.61%	60.39%
Other Hexanes	11.34%	88.66%
Heptanes	23.33%	76.67%
Methylcyclohexane	44.44%	55.56%
Benzene	79.93%	20.07%
Toluene	85.49%	14.51%
Xylenes	93.32%	6.68%
C8+ Heavies	55.70%	44.30%

REGENERATOR

 No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	44.61%	55.39%
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	3.15%	96.85%
n-Pentane	3.02%	96.98%
n-Hexane	2.32%	97.68%
Cyclohexane	7.26%	92.74%
Other Hexanes	5.15%	94.85%
Heptanes	1.64%	98.36%
Methylcyclohexane	8.12%	91.88%
Benzene	6.19%	93.81%
Toluene	9.18%	90.82%
Xylenes	13.80%	86.20%
C8+ Heavies	17.36%	82.64%

STREAM REPORTS:

WET GAS STREAM

 Temperature: 70.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 7.09e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.97e-002	1.67e+001
Carbon Dioxide	2.24e-001	1.84e+002
Nitrogen	7.37e-001	3.86e+002
Methane	8.19e+001	2.45e+004
Ethane	1.26e+001	7.09e+003
Propane	3.00e+000	2.47e+003
Isobutane	3.95e-001	4.29e+002
n-Butane	5.83e-001	6.33e+002
Isopentane	1.52e-001	2.05e+002
n-Pentane	1.11e-001	1.50e+002
n-Hexane	3.29e-002	5.29e+001
Cyclohexane	9.50e-003	1.49e+001
Other Hexanes	6.98e-002	1.12e+002
Heptanes	3.88e-002	7.26e+001
Methylcyclohexane	4.00e-004	7.33e-001
Benzene	1.10e-003	1.60e+000
Toluene	3.30e-003	5.68e+000
Xylenes	2.90e-003	5.75e+000

C8+ Heavies	4.13e-002	1.31e+002

Total Components	100.00	3.65e+004

DRY GAS STREAM

Temperature: 70.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 7.08e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	2.37e-003	7.97e-001
Carbon Dioxide	2.24e-001	1.84e+002
Nitrogen	7.38e-001	3.86e+002
Methane	8.20e+001	2.45e+004
Ethane	1.26e+001	7.08e+003
Propane	3.00e+000	2.47e+003
Isobutane	3.95e-001	4.29e+002
n-Butane	5.83e-001	6.32e+002
Isopentane	1.52e-001	2.05e+002
n-Pentane	1.11e-001	1.50e+002
n-Hexane	3.29e-002	5.29e+001
Cyclohexane	9.43e-003	1.48e+001
Other Hexanes	6.97e-002	1.12e+002
Heptanes	3.87e-002	7.24e+001
Methylcyclohexane	3.97e-004	7.28e-001
Benzene	1.01e-003	1.48e+000
Toluene	2.94e-003	5.05e+000
Xylenes	2.36e-003	4.68e+000
C8+ Heavies	4.12e-002	1.31e+002

Total Components	100.00	3.65e+004

LEAN GLYCOL STREAM

Temperature: 70.00 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	3.35e-012	2.83e-011
Nitrogen	5.30e-013	4.48e-012
Methane	9.45e-018	7.97e-017
Ethane	1.17e-007	9.86e-007
Propane	5.31e-009	4.49e-008
Isobutane	9.17e-010	7.74e-009
n-Butane	1.49e-009	1.26e-008
Isopentane	9.30e-005	7.85e-004
n-Pentane	8.93e-005	7.54e-004
n-Hexane	4.96e-005	4.19e-004
Cyclohexane	4.36e-004	3.68e-003
Other Hexanes	1.61e-004	1.36e-003
Heptanes	1.20e-004	1.01e-003
Methylcyclohexane	2.77e-005	2.34e-004
Benzene	7.89e-004	6.66e-003

Toluene	6.36e-003	5.37e-002
Xylenes	1.88e-002	1.59e-001
C8+ Heavies	6.61e-003	5.58e-002

Total Components	100.00	8.44e+002
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RICH GLYCOL AND PUMP GAS STREAM

Temperature: 70.00 deg. F
 Pressure: 1014.70 psia
 Flow Rate: 1.62e+000 gpm
 NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.22e+001	8.31e+002
Water	3.18e+000	2.86e+001
Carbon Dioxide	4.90e-002	4.42e-001
Nitrogen	4.19e-002	3.78e-001
Methane	2.61e+000	2.36e+001
Ethane	9.10e-001	8.21e+000
Propane	3.59e-001	3.24e+000
Isobutane	6.97e-002	6.28e-001
n-Butane	1.17e-001	1.05e+000
Isopentane	3.71e-002	3.34e-001
n-Pentane	3.11e-002	2.80e-001
n-Hexane	1.44e-002	1.29e-001
Cyclohexane	1.42e-002	1.28e-001
Other Hexanes	2.58e-002	2.33e-001
Heptanes	2.94e-002	2.65e-001
Methylcyclohexane	7.20e-004	6.49e-003
Benzene	1.49e-002	1.35e-001
Toluene	7.59e-002	6.84e-001
Xylenes	1.37e-001	1.23e+000
C8+ Heavies	6.40e-002	5.77e-001
Total Components	100.00	9.01e+002

FLASH TANK OFF GAS STREAM

Temperature: 165.00 deg. F
 Pressure: 64.70 psia
 Flow Rate: 7.13e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.88e-001	2.33e-001
Carbon Dioxide	5.04e-001	4.17e-001
Nitrogen	7.14e-001	3.75e-001
Methane	7.77e+001	2.34e+001
Ethane	1.42e+001	8.04e+000
Propane	3.75e+000	3.11e+000
Isobutane	5.44e-001	5.94e-001
n-Butane	8.99e-001	9.81e-001
Isopentane	2.28e-001	3.09e-001
n-Pentane	1.88e-001	2.55e-001
n-Hexane	6.88e-002	1.11e-001
Cyclohexane	4.88e-002	7.72e-002
Other Hexanes	1.27e-001	2.06e-001

Heptanes	1.08e-001	2.03e-001
Methylcyclohexane	1.95e-003	3.60e-003
Benzene	1.84e-002	2.70e-002
Toluene	5.74e-002	9.93e-002
Xylenes	4.12e-002	8.23e-002
C8+ Heavies	7.99e-002	2.56e-001

Total Components	100.00	3.88e+001

FLASH TANK GLYCOL STREAM

 Temperature: 165.00 deg. F
 Flow Rate: 1.54e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.64e+001	8.31e+002
Water	3.29e+000	2.84e+001
Carbon Dioxide	2.91e-003	2.51e-002
Nitrogen	2.78e-004	2.40e-003
Methane	1.78e-002	1.54e-001
Ethane	1.92e-002	1.66e-001
Propane	1.51e-002	1.30e-001
Isobutane	4.02e-003	3.47e-002
n-Butane	8.38e-003	7.23e-002
Isopentane	2.89e-003	2.50e-002
n-Pentane	2.89e-003	2.49e-002
n-Hexane	2.09e-003	1.81e-002
Cyclohexane	5.87e-003	5.06e-002
Other Hexanes	3.06e-003	2.64e-002
Heptanes	7.18e-003	6.19e-002
Methylcyclohexane	3.34e-004	2.88e-003
Benzene	1.25e-002	1.08e-001
Toluene	6.78e-002	5.85e-001
Xylenes	1.33e-001	1.15e+000
C8+ Heavies	3.73e-002	3.21e-001

Total Components	100.00	8.62e+002

FLASH GAS EMISSIONS

 Flow Rate: 1.63e+003 scfh
 Control Method: Combustion Device
 Control Efficiency: 50.00

Component	Conc. (vol%)	Loading (lb/hr)

Water	4.98e+001	3.86e+001
Carbon Dioxide	2.84e+001	5.39e+001
Nitrogen	3.12e-001	3.75e-001
Methane	1.70e+001	1.17e+001
Ethane	3.11e+000	4.02e+000
Propane	8.19e-001	1.55e+000
Isobutane	1.19e-001	2.97e-001
n-Butane	1.96e-001	4.91e-001
Isopentane	4.98e-002	1.55e-001
n-Pentane	4.11e-002	1.28e-001
n-Hexane	1.50e-002	5.57e-002

Cyclohexane	1.07e-002	3.86e-002
Other Hexanes	2.78e-002	1.03e-001
Heptanes	2.36e-002	1.02e-001
Methylcyclohexane	4.27e-004	1.80e-003
Benzene	4.02e-003	1.35e-002
Toluene	1.25e-002	4.96e-002
Xylenes	9.00e-003	4.11e-002
C8+ Heavies	1.74e-002	1.28e-001

Total Components	100.00	1.12e+002

REGENERATOR OVERHEADS STREAM

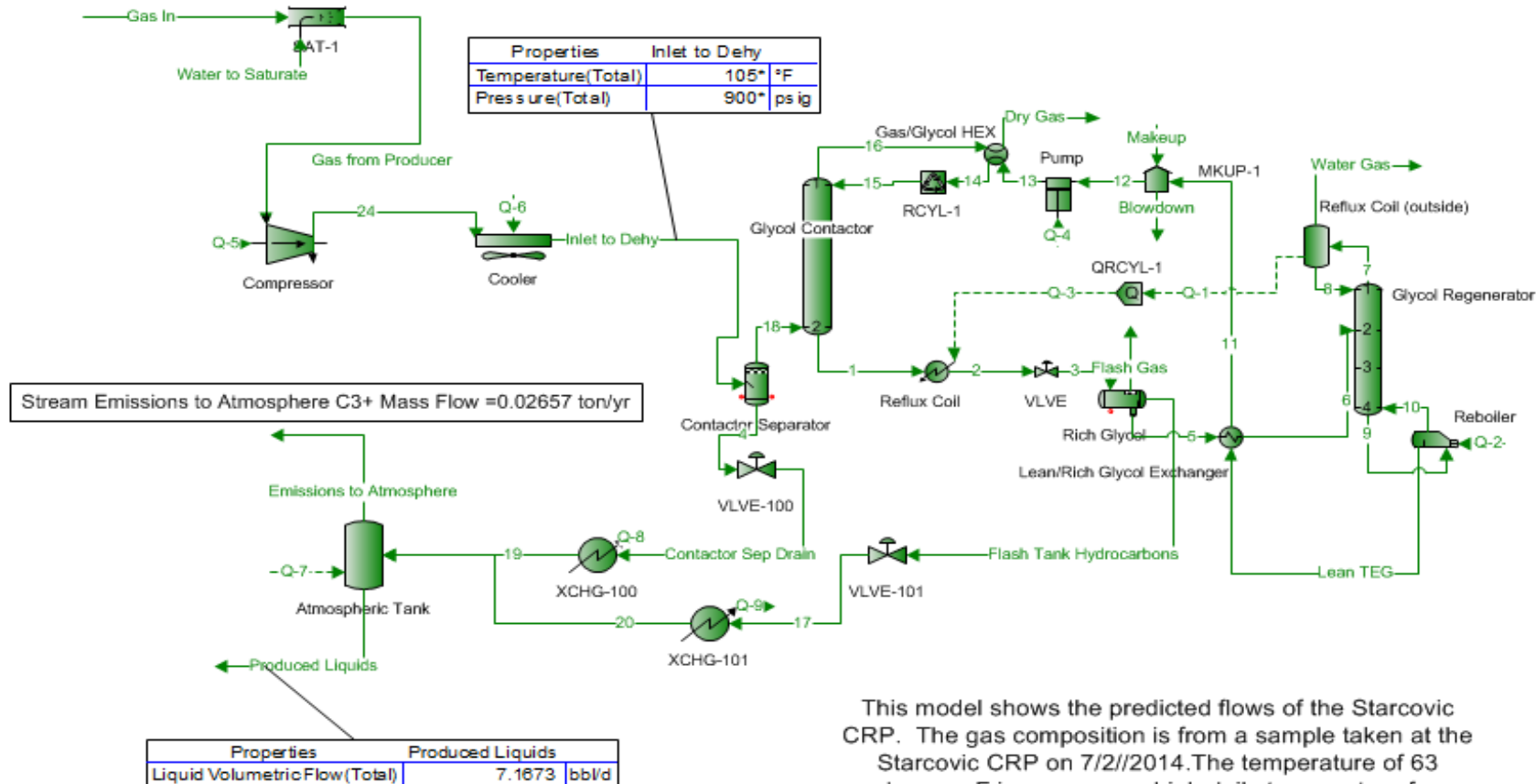
Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 3.47e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)

Water	9.55e+001	1.57e+001
Carbon Dioxide	6.25e-002	2.51e-002
Nitrogen	9.37e-003	2.40e-003
Methane	1.05e+000	1.54e-001
Ethane	6.04e-001	1.66e-001
Propane	3.23e-001	1.30e-001
Isobutane	6.53e-002	3.47e-002
n-Butane	1.36e-001	7.23e-002
Isopentane	3.67e-002	2.42e-002
n-Pentane	3.67e-002	2.42e-002
n-Hexane	2.24e-002	1.76e-002
Cyclohexane	6.10e-002	4.69e-002
Other Hexanes	3.18e-002	2.50e-002
Heptanes	6.65e-002	6.09e-002
Methylcyclohexane	2.95e-003	2.65e-003
Benzene	1.41e-001	1.01e-001
Toluene	6.31e-001	5.31e-001
Xylenes	1.02e+000	9.90e-001
C8+ Heavies	1.71e-001	2.66e-001

Total Components	100.00	1.84e+001

Starcovic CRP



This model shows the predicted flows of the Starcovic CRP. The gas composition is from a sample taken at the Starcovic CRP on 7/2//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: Starcovic
 Condensate Volume: 2616.065 bbl/yr
 Total VOC's: 0.02657 ton/yr

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	6.9102

Emissions to Atmosphere	
Component	tons/year
Water	0.01
TEG	0.00
Nitrogen	0.00
Methane	0.35
CO2	0.03
Ethane	0.08
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	6.09E-06
3-Methylhexane	1.21E-05
1,t-2-Dimethylcyclopentane	3.98E-08
1,t-3Dimethylcyclopentane	1.39E-06
Heptane	9.88E-06
Methylcyclohexane	0
2,5-Dimethylhexane	2.60E-07
2,3-Dimethylhexane	3.57E-06
Toluene	0.000356593
2-Methylheptane	1.59E-06
4-Methylheptane	1.88E-06
3-Methylheptane	4.62E-06
1,t-4-Dimethylcyclohexane	1.24E-09
Octane	4.22E-06
2,4,4-Trimethylhexane	1.35E-06
2,6-Dimethylheptane	6.39E-07
Ethylcyclohexane	0
Nonane	3.97E-06
Decane	2.86E-06
Undecane	2.68E-06
m-Xylene	0.000223703
Oxygen	2.39E-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	1.77E-08
3-Methylhexane	2.37E-08
1,t-2-Dimethylcyclopentane	1.51E-12
1,t-3Dimethylcyclopentane	2.15E-08
Heptane	2.16E-08
Methylcyclohexane	0
2,5-Dimethylhexane	8.52E-11
2,3-Dimethylhexane	1.27E-08
Toluene	0.000253005
2-Methylheptane	7.83E-10
4-Methylheptane	3.38E-09
3-Methylheptane	8.88E-09
1,t-4-Dimethylcyclohexane	8.85E-17
Octane	4.99E-09
2,4,4-Trimethylhexane	3.94E-09
2,6-Dimethylheptane	4.09E-10
Ethylcyclohexane	0
Nonane	7.82E-09
Decane	3.47E-09
Undecane	4.37E-09
m-Xylene	0.000156635
Oxygen	1.33E-07

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
-

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

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.
-

Williams Ohio Valley Midstream LLC
STARCOVIC COMPRESSOR STATION
Application for 45CSR13 NSR Modification Permit
Attachment P
Public Notice

AIR QUALITY PUBLIC NOTICE
Notice of Application

Notice is given that Williams Ohio Valley Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a 45CSR13 New Source Review (NSR) Modification Permit for the existing Starcovic Compressor Station; located ~0.2 Miles North of State Route 25, ~1.0 Miles East-Northeast of Cameron in Marshall County, West Virginia.

The latitude and longitude coordinates are 39.8328 degrees North and -80.5838 degrees West.

The applicant estimates the increase/(decrease) in the potential to discharge the following regulated air pollutants will be:

(7.12) tons of nitrogen oxides per year
(4.34) tons of carbon monoxide per year
21.79 tons of volatile organic compounds per year
(0.007) tons of sulfur dioxide per year
(0.52) tons of particulate matter per year
0.58 tons of benzene per year
0.80 tons of ethylbenzene per year
(0.27) tons of formaldehyde per year
0.89 tons of n-hexane per year
2.20 tons of toluene per year
0.82 tons of 2,2,4-trimethylpentane per year
3.28 tons of xylenes per year
7.44 tons of total hazardous air pollutants per year
5,137 tons of carbon dioxide equivalent per year

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the _____ 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)

also

ATTACHMENT R
Authority Forms
(NOT APPLICABLE)

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: \$1,500 Not Applicable
 - NESHAP Requirements: \$2,500 Not Applicable
- Total application fee is **\$1,000** [= \$1,000 minimum fee + \$0 additional charges]

The glycol dehydrator is an existing exempt source.

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



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

COMPANY NUMBER: 4000
 CHECK NUMBER: 4000108446

PAY DATE	SUPPLIER NO.	SUPPLIER NAME	CHECK TOTAL
15-MAY-15	401733	STATE OF WEST VIRGINIA	1,000.00

Invoice Date	Invoice Or Credit Memo / Invoice Description	Gross	Discount	Net
14-MAY-15	14-MAY-2015 / AIR PERMIT APPLICATION FEE FOR THE	1,000.00	0.00	1,000.00
Supplier Support 1-866-778-2665		Page Totals	0.00	1,000.00

VERIFY THE AUTHENTICITY OF THIS MULTI-TONE SECURITY DOCUMENT.

CHECK BACKGROUND AREA CHANGES COLOR GRADUALLY FROM TOP TO BOTTOM.



WILLIAMS FIELD SERVICES GROUP, INC
 PO BOX 21218
 TULSA, OK 74121-1218
 Company Number: 4000

JPMorgan Chase Bank, N.A. 70-2322719
 Chicago, IL

Check Number: 4000108446
 Check Date: 15-MAY-15

One Thousand Dollars And Zero Cents

Pay To The Order Of:
 STATE OF WEST VIRGINIA
 WV DEP - DIVISION OF AIR QUALITY
 601 57TH ST SE
 CHARLESTON, WV 25304 United States

PAY (USD)	\$1,000.00
-----------	------------

Donna R. Chappel
 Authorized Signature

⑈4000108446⑈ ⑆071923226⑆

009401167⑈

From: (412) 787-4197
Danell Zawaski
WILLIAMS
2000 Commerce Drive
Park Plaza 2
Pittsburgh, PA 15275

Origin ID: OLA



Ship Date: 18MAY15
ActWgt: 1.0 LB
CAD: 104269589/NET3610

Delivery Address Bar Code



SHIP TO: (304) 926-0499 X 1269

BILL SENDER

Beverly McKeone
WV Div of Air Quality - Permitting
601 57th Street, SE

Charleston, WV 25304

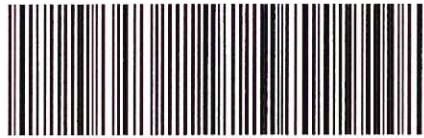
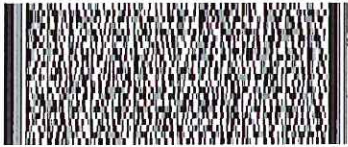
Ref# 60000006200060034 6228.8325
Invoice #
PO #
Dept #

WED - 20 MAY AA
** 2DAY **

TRK# 7736 2826 9860
[8201]

25304
WV-US
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SH CRWA



537.D\0315.EE4B

After printing this label:

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2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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