



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

July 23, 2015
(Via Federal Express)

Beverly McKeone
New Source Review Program Manager
Division of Air Quality
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304-2345

**Subject: Application for 45CSR13 NSR Modification Permit
 Williams Ohio Valley Midstream LLC
 DEWHURST DEHYDRATION STATION
 Wetzel County, West Virginia**

Dear Ms. McKeone,

Williams Ohio Valley Midstream LLC (OVM) is submitting an Application for 45CSR13 New Source Review (NSR) Modification Permit for the existing (though currently exempt) Dewhurst Dehydration Station, located at 4262 Buffalo Run Road (CR-8/2), 4.1 miles SSE of Jacksonburg, in Wetzel County, West Virginia.

This application for 45CSR13 NSR Modification Permit has been prepared and submitted to provide for the following equipment and operations at the subject facility:

- One (1) 12.5 MMscfd Triethylene Glycol (TEG) Dehydrator 01 comprised of:
 - One (1) Flash Tank w/ $\geq 50\%$ Off-Gas Recycle DFT-01/1E
 - One (1) Regenerator/Still Vent DSV-01/2E
 - One (1) 0.30 MMBtu/hr Natural Gas-Fired Reboiler RBV-01/3E
- One (1) NEW 210 bbl Produced Water Storage Tank T-01/4E
- One (1) NEW 2,520 bbl/yr Produced Water Truck Load-Out TLO/5E
- Piping and Equipment Fugitives – Gas & Water/Oil FUG/1F

Please note the TEG dehydrator still vent emissions are shown as uncontrolled in the permit application. Due to odor concerns at the facility, a BTEX unit is likely to be installed on the dehydrator in the future resulting in a reduction in emissions.

Beverly McKeone
WVDEP – Division of Air Quality
July 23, 2015
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The facility continues to qualify as a Minor Source under Non-Attainment New Source Review (NNSR), Prevention of Significant Deterioration (PSD), and Title V Operating Permits. The facility is also an Area Source for Hazardous Air Pollutants (HAP) under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.

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

Sincerely,



R. Danell Zawaski, P.E.
Environmental Specialist

Enclosures:

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

**APPLICATION FOR
45CSR13 NEW SOURCE REVIEW (NSR)
MODIFICATION PERMIT**

For the:

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
Wetzel County, West Virginia

Submitted to:



WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

Submitted by:



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

Prepared by:



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

July 2015

**APPLICATION FOR
45CSR13 NEW SOURCE REVIEW (NSR)
MODIFICATION PERMIT**

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
Wetzel County, West Virginia

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APPLICATION FEE

**APPLICATION FOR
45CSR13 NEW SOURCE REVIEW (NSR)
MODIFICATION PERMIT**

-
- **SECTION I. General**
 - **SECTION II. Additional Attachments and Supporting Documents**
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-



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

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

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

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

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

- ☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION** ☒ **NOT APPLICABLE**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION
INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

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

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office): WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM)		2. Federal Employer ID No. (FEIN): 27 - 0856707	
3. Name of facility (if different from above): DEWHURST DEHYDRATION 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: SOUTHWEST SIDE OF BUFFALO RUN ROAD ~4.1 MILES SOUTH OF JACKSONBURG WETZEL COUNTY, WV	
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 <i>proposed site</i> ? <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.): 1389 - OIL AND GAS FIELD SERVICES, N.E.C.		10. North American Industry Classification System (NAICS) code for the facility: 213112 - SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS	
11A. DAQ Plant ID No. (existing facilities): NA		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities): NA – CURRENTLY PERMIT EXEMPT	
12A. Directions to the facility: – 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 WV-20/SHORTLINE HWY IN JACKSONBURG: A. HEAD WEST ON MAIN STREET ~ 0.1 MILES; B. TURN LEFT ONTO BUFFALO RUN ROAD ~ 4.8 MILES; C. ENTRANCE TO SITE IS ON THE RIGHT.			

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

12.B. New site address (if applicable): SEE ABOVE	12C. Nearest city or town: JACKSONBURG	12D. County: WETZEL
12.E. UTM Northing (KM): 4,369.46 KM NORTHING	12F. UTM Easting (KM): 532.23 KM EASTING	12G. UTM Zone: 17S
13. Briefly describe the proposed change(s) at the facility: THIS APPLICATION FOR 45CSR13 NSR MODIFICATION PERMIT HAS BEEN PREPARED AND SUBMITTED TO PROVIDE FOR THE FOLLOWING EQUIPMENT AND OPERATIONS AT THE SUBJECT FACILITY: <ul style="list-style-type: none"> • ONE (1) 12.5 MMSCFD TRIETHYLENE GLYCOL (TEG) DEHYDRATOR 01 COMPRISED OF: <ul style="list-style-type: none"> - ONE (1) FLASH TANK W/ \geq 50% OFF-GAS RECYCLE - ONE (1) REGENERATOR/STILL VENT - ONE (1) 0.30 MMBTU/HR NATURAL GAS-FIRED REBOILER • ONE (1) NEW 210 BBL PRODUCED WATER STORAGE TANK • ONE (1) NEW 2,520 BBL/YR PRODUCED WATER TRUCK LOAD-OUT • PIPING AND EQUIPMENT FUGITIVES <div style="text-align: right;"> DFT-01/1E DSV-01/2E RBV-01/3E T-01/4E TLO/5E FUG/1F </div>		
14A. Provide the date of anticipated installation or change: ~2 MONTHS AFTER PERMIT – If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: NA		14B. Date of anticipated Start-Up if a permit is granted: NA
14C. Provide a Schedule of the planned Installation of/Change to and Start-Up of each of the units proposed in this permit application as Attachment C (if more than one unit is involved).		
15. Provide maximum projected Operating Schedule of activity/activities outlined in this application: Hours Per Day: 24 Days Per Week: 7 Weeks Per Year: 52		
16. Is demolition or physical renovation at an existing facility involved? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
17. Risk Management Plans. If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your Risk Management Plan (RMP) to U.S. EPA Region III.		
18. Regulatory Discussion. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<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 .		

Section II. Additional attachments and supporting documents.

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

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

<input checked="" type="checkbox"/> Bulk Liquid Transfer (TLO/5E)	<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 (T-01/4E)
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	

☒ **General Emission Unit, specify:**

- NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET (DFT-01/1E, DSV-01/2E, RBV-01/3E)**
- FUGITIVE LEAK SOURCES (FUG/1F)**

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

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

<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
<input type="checkbox"/> 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: **NA**

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

Submit completed and signed Authority Form as Attachment R.

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

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

Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE: _____

(Please use blue ink)

DATE: _____

(Please use blue ink)

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

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- | | |
|--|--|
| <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) (NA) |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations |
| <input checked="" type="checkbox"/> Attachment E: Plot Plan | <input checked="" type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input checked="" type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s) | <input checked="" type="checkbox"/> Attachment P: Public Notice |
| <input checked="" type="checkbox"/> Attachment G: Process Description | <input type="checkbox"/> Attachment Q: Business Confidential Claims) (NA) |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input type="checkbox"/> Attachment R: Authority Forms) (NA) |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table | <input type="checkbox"/> Attachment S: Title V Permit Revision Information) (NA) |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee |

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

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

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

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

ATTACHMENT A

Business Certificate

“6. **West Virginia Business Registration.** Provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.”

- **Certificate of Amendment to the Certificate of Authority**

From: CAIMAN EASTERN MIDSTREAM, LLC
To: WILLIAMS OHIO VALLEY MIDSTREAM LLC
Date: May 15, 2012

- **Certificate of Authority of a Foreign Limited Liability Company**

To: CAIMAN EASTERN MIDSTREAM, LLC
Date: September 11, 2009



Certificate

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

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

CAIMAN EASTERN MIDSTREAM, LLC

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

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

WILLIAMS OHIO VALLEY MIDSTREAM LLC



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

Natalie E. Tennant

Secretary of State

State of West Virginia



Certificate

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

CAIMAN EASTERN MIDSTREAM, LLC

Control Number: 99GIS

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

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

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

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



Natalie E. Tennant

Secretary of State

ATTACHMENT B

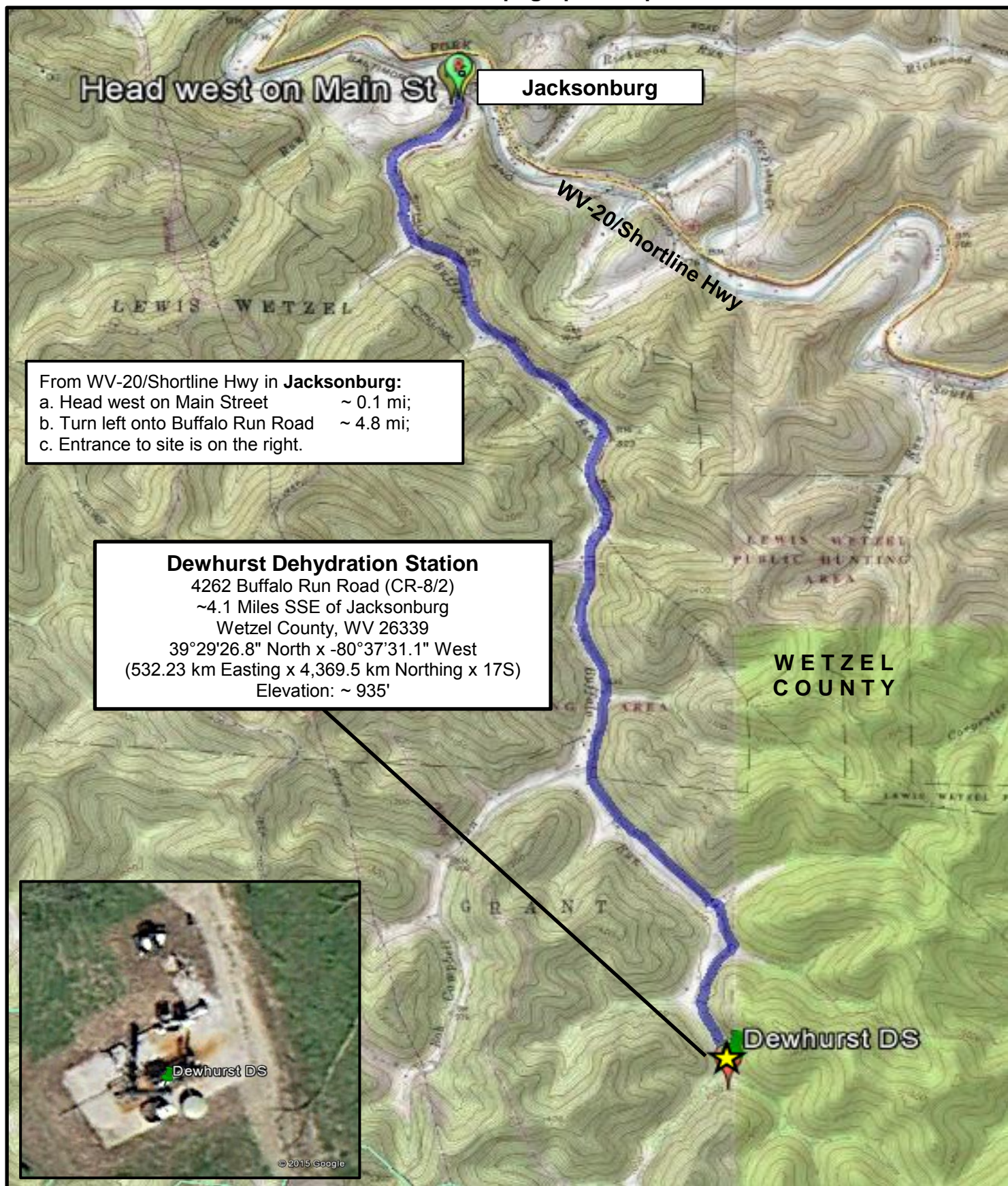
Map(s)

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

- **Address:**
4262 Buffalo Run Road (CR 8/2)
~4.1 Miles South-Southeast of Jacksonburg
Wetzel County, WV 26339
 - **Latitude and Longitude:**
39°28'26.80" North x -80°37'31.10" West
(39.474° North x -80.625° West)
 - **UTM:**
532.23 km Easting x 4,369.46 km Northing x Zone 17S
 - **Elevation:**
~935'
 - **Directions:**
From WV-20/Shortline Hwy in **Jacksonburg**:
 - a. Head west on Main Street ~ 0.1 mi;
 - b. Turn left onto Buffalo Run Road ~ 4.8 mi;
 - c. Entrance to site is on the right.
 - **USGS:**
7.5" Topographic – Center Point - WV – 2014
-

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
Application for 45CSR NSR Modification Permit
Attachment B - Map(s)

Location/Topographic Map



ATTACHMENT C

Installation and Start-Up Schedule

“14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as Attachment C.”

It is anticipated that the proposed modifications will be implemented w/in two (2) months of permit issuance.

ATTACHMENT D

Regulatory Discussion

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

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

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
Application for 45CSR13 NSR Modification Permit

Attachment D
REGULATORY DISCUSSION

A. Applicability of New Source Review (NSR) Regulations

The following New Source Review (NSR) regulations are potentially applicable to natural gas production facilities. Applicability to the Williams Ohio Valley Midstream LLC Dewhurst Dehydration Station (“subject facility”) has been determined as follows:

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

This rule does not apply. The subject 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

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

This rule does not apply. The subject 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 subject 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 subject 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 subject facility has been determined as follows:

1. **NSPS A, General Provisions**

40CFR§60.1-§60.19

[Not Applicable]

This rule does not apply because there are no NSPS affected 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 subject facility with a maximum design heat input capacity ≥ 10 MMBtu/hr and ≤ 100 MMBtu/hr (§60.40c(a)).

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

40CFR§60.110b-§60.117b

[Not Applicable]

This rule does not apply because there is no tank used to store volatile organic liquids (VOL) with a design capacity ≥ 75 m³ (19,815 gal, 471.8 bbl) (§60.110b(a)).

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

40CFR§60.330-§60.335

[Not Applicable]

This rule does not apply because there is no stationary gas turbine at the subject 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 subject 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 subject 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 subject 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 because there is no stationary combustion engine at the subject facility (§60.4230).
- 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 subject 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 produced water storage vessel (tank) because the tank does not have the potential to emit VOC ≥ 6 tpy (§60.5420).
This rule does not apply to the pneumatic controllers because their bleed rate is < 6 scfh, located between the wellhead and point of custody transfer, and not located at a natural gas processing plant (§60.5365(d)(i)).
This rule does not apply to the group of all equipment, except compressors, within a process unit (§60.5365(f)).
- 11. NESHAP A, General Provisions**
40CFR§63.1-§63.16 [Applicable]
This rule does apply to the 12.5 MMscfd Dehydrator 01 (DFT-01/1E and DSV-01/2E) because it is subject to NESHAP Subpart HH. Requirements include notification and recordkeeping.
- 12. NESHAP HH, Oil and Natural Gas Production Facilities**
40CFR§63.760-§63.779 [Applicable]
This rule does apply to the 12.5 MMscfd Dehydrator 01 (DFT-01/1E and DSV-01/2E). However, because the TEG dehydrator has a benzene PTE < 0.9 megagrams per year (< 1.0 tpy), 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 subject 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 subject facility is not a natural gas transmission or storage subject 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 subject facility (§63.6080).

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

40CFR§63.6580-§63.6675

[Not Applicable]

This rule does not apply because there is no stationary gas turbine at the subject facility (§63.6580).

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

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

40CFR§63.11193 – §63.11237

[Not Applicable]

This rule does not apply because gas-fired boilers are not subject to the requirements of this subpart (§63.11195(e)). Specifically, “boiler” is defined as an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water.

18. Chemical Accident Prevention Provisions

40CFR§68.1-§68.220

[Not Applicable]

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

20. Mandatory Greenhouse Gases (GHG) Reporting

40CFR§98.1-§98.9

[Not Applicable]

This rule does not apply. The subject 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 subject facility is the WGGGS Compressor Station, which is located approximately 1.1 miles north-northwest. These two facilities do not meet the common sense definition of being "contiguous" or "adjacent".

The subject facility 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 and currently operated by Trans Energy.

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 production wells, including the Trans Energy 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 Trans Energy wellpad or in any production well or production company 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 Trans Energy well.

Summary

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

D. Applicability of State Regulations

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

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

45CSR2

[Applicable]

This rule does apply, however, because the dehydrator reboiler (RBV-01/3E) 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 subject 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 subject facility has a Maximum Design Heat Input (MDHI) rating < 10 MMBtu/hr.

5. Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

45CSR13

[Applicable]

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

6. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants

45CSR14

[Not Applicable]

The rule does not apply because the subject facility is not a major source of air pollutants.

- 7. Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60**
45CSR16 [Not Applicable]
The rule does not apply because there are no NSPS affected sources at the subject facility.
- 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 subject facility is a minor (or “deferred”) source of all regulated pollutants.
- 9. Regulation of Volatile Organic Compounds (VOC)**
45CSR21 [Not Applicable]
This rule does not apply because the subject facility is not located in Putnam County, Kanawha County, Cabell County, Wayne County, or Wood County
- 10. Air Quality Management Fees Program**
45CSR22 [Applicable]
This rule does apply. It establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution.
- 11. Prevent and Control Emissions of Toxic Air Pollutants**
45CSR27 [Not Applicable]
This rule does not apply because equipment 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 subject 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 subject 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 subject facility is a minor (or non-major or “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

[Applicable]

This rule does apply by reference to §40CFR63, Subpart HH. Williams OVM is subject to the recordkeeping, monitoring, and testing required of this Subpart.

ATTACHMENT E

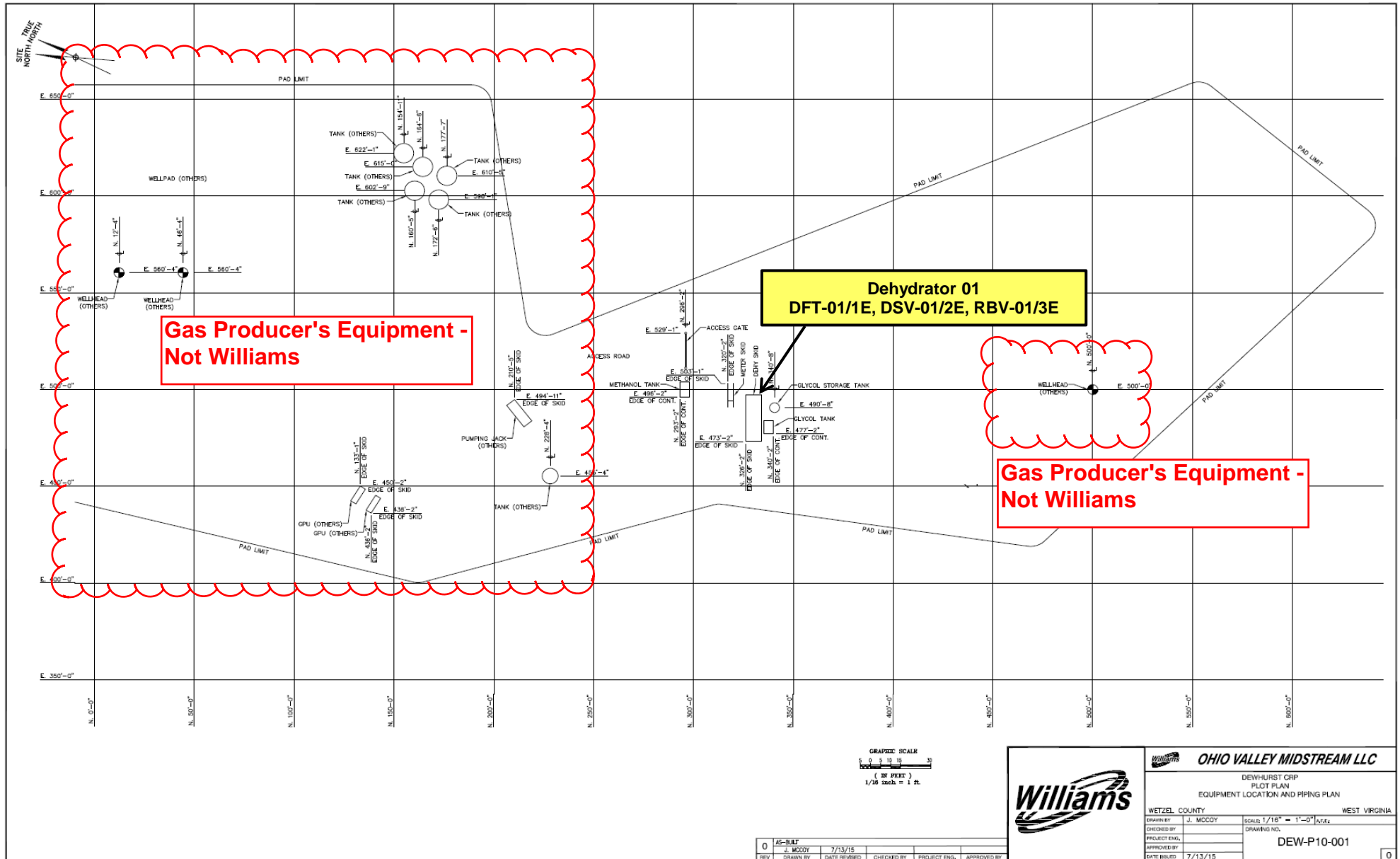
Plot Plan

“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
DEWHURST DEHYDRATION STATION
 Application for 45CSR NSR Modification Permit
Attachment E - Plot Plan(s)

Plot Plan



ATTACHMENT F

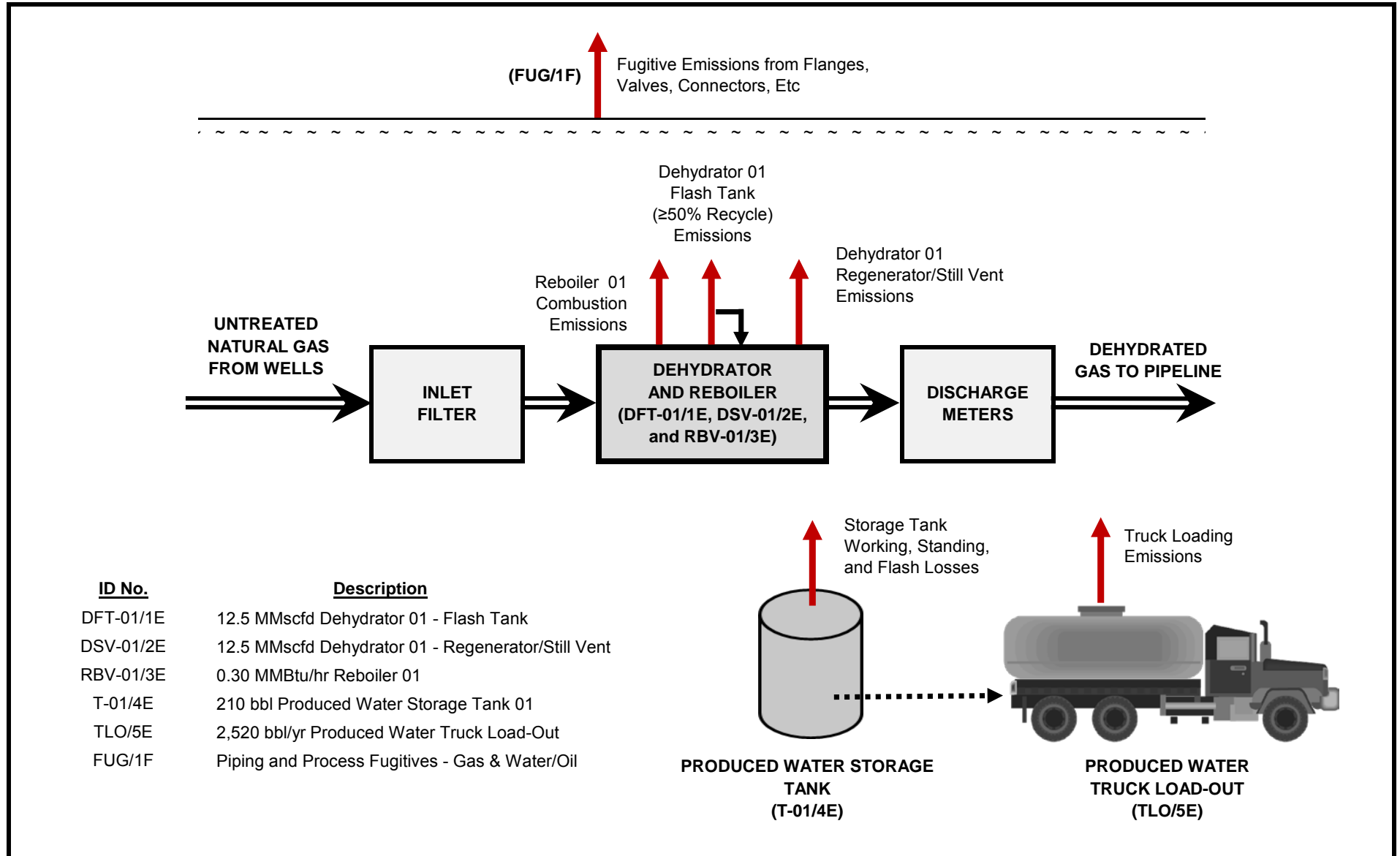
Detailed Process Flow Diagram

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

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

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR NSR Modification Permit
 Attachment F - Detailed Process Flow Diagram(s)

Process Flow Diagram (PFD)



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. Triethylene Glycol (TEG) Dehydrator – Flash Tank and Still Vent Dehydrator
 - C. Triethylene Glycol (TEG) Dehydrator – Reboiler
 - D. Storage Tanks
 - E. Truck Load-Out
 - F. Piping and Equipment Fugitive Emissions
-

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
Application for 45CSR13 Permit

Attachment G
PROCESS DESCRIPTION

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the existing Dewhurst Dehydration Station located at 4262 Buffalo Run Road, approximately 4.1 miles South of Jacksonburg, in Wetzel County (See Appendix B – Site Location Maps). The facility receives natural gas from local production wells then dehydrates the gas for delivery to a gathering pipeline.

This application for 45CSR13 NSR Modification Permit has been prepared and submitted to provide for the following equipment and operations at the subject facility:

- One (1) 12.5 MMscfd Triethylene Glycol (TEG) Dehydrator 01 comprised of:
 - One (1) Flash Tank w/ $\geq 50\%$ Off-Gas Recycle DFT-01/1E
 - One (1) Regenerator/Still Vent DSV-01/2E
 - One (1) 0.30 MMBtu/hr Natural Gas-Fired Reboiler RBV-01/3E
- One (1) NEW 210 bbl Produced Water Storage Tank T-01/4E
- One (1) NEW 2,520 bbl/yr Produced Water Truck Load-Out TLO/5E
- Piping and Equipment Fugitives – Gas & Water/Oil FUG/1F

B. Dehydrator

One (1) 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.

The 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 an absorber tower where the gas is contacted with lean glycol. The lean glycol absorbs the water in the gas stream and becomes rich glycol, laden with water and trace amounts of hydrocarbons.

The rich glycol is then sent to the flash tank where the pressure is reduced, thus liberating the lighter hydrocarbon, primarily methane, but also significant quantities of VOCs. A minimum of 50% of the flash tank off-gas is recycled as fuel in the reboiler.

Following the flash tank, the rich glycol is then routed to the regenerator/still where it is boiled 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.

C. Reboiler

A reboiler is utilized to supply heat for the regenerator/still. The reboiler is fueled by primarily by the flash tank off-gas, with supplemental natural gas as requisite.

D. Storage Tanks

There are tanks at the facility used to store various materials, including produced water, triethylene glycol and methanol. All of these tanks generate de-minimis (insignificant) emissions.

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

A ProMax simulation was completed to determine the presence of flash emissions from the 210 bbl produced water storage tank. The ProMax process simulation showed minimal tank flash emissions and these losses are included in the emission estimates.

E. 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.

F. Piping and Equipment Fugitive Emissions

Piping and process equipment generate leaks from different component types (connectors, flanges, valves, etc.) in gas-vapor service and water/oil service.

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

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

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

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

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment H - Gas Analysis

Extended Gas Analysis Summary

Gas Analysis - Sampled 07/02/13

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#)
				Sampled 07/02/13				
Water	109-86-4	H2O	18.02	---	---	---	---	---
Carbon Monoxide	630-08-0	CO	28.01	---	---	---	---	---
Nitrogen	7727-37-9	N2	28.01	0.3574	0.00357	0.1001	0.5286	263.84
Oxygen	7782-44-7	O2	32.00	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.09	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.01	0.1381	0.00138	0.0608	0.3209	160.16
Methane*	75-82-8	CH4	16.04	84.8558	0.84858	13.6134	71.8689	35,873.59
Ethane*	74-84-0	C2H6	30.07	10.9436	0.10944	3.2907	17.3727	8,671.66
Propane**	74-98-6	C3H8	44.10	2.5387	0.02539	1.1195	5.9101	2,950.05
i-Butane**	75-28-5	C4H10	58.12	0.3342	0.00334	0.1943	1.0255	511.88
n-Butane**	106-97-8	C4H10	58.12	0.4665	0.004665	0.2711	1.4315	714.52
Cyclopentane**	287-92-3	C5H10	70.10	0.0001	0.000001	0.0001	0.0004	0.18
i-Pentane**	78-78-4	C5H12	72.15	0.1305	0.001305	0.0942	0.4971	248.12
n-Pentane**	109-66-0	C5H12	72.15	0.0854	0.000854	0.0616	0.3253	162.37
Cyclohexane**	110-82-7	C6H12	84.16	0.0071	0.000071	0.0060	0.0315	15.75
Other Hexanes**	110-54-3	C6H14	86.18	0.0584	0.000584	0.0503	0.2657	132.62
Methylcyclohexanes**	varies	C7H14	98.19	0.0057	0.000057	0.0056	0.0295	14.75
Heptanes**	varies	C7H16	100.20	0.0380	0.000380	0.0381	0.2010	100.34
C8+ Heavies**	varies	C8+	130.00 est	0.0073	0.000073	0.0095	0.0501	25.01
Benzene***	71-43-2	C6H6	78.11	0.0008	0.000008	0.0006	0.0033	1.65
Ethylbenzene***	100-41-4	C8H10	106.17	0.0001	0.000001	0.0001	0.0006	0.28
n-Hexane***	110-54-3	C6H14	86.18	0.0237	0.000237	0.0204	0.1078	53.82
Toluene***	108-88-3	C7H8	92.14	0.0018	0.000018	0.0017	0.0088	4.37
2,2,4-Trimethylpentane**	540-84-1	C8H18	114.23	0.0001	0.000001	0.0001	0.0006	0.30
Xylenes***	1330-20-7	C8H10	106.17	0.0036	0.000036	0.0038	0.0202	10.07

Total:	100.00	1.0000	18.94	100.00	49,915
THC:	99.50	0.9950	18.78	99.15	49,491
Total CH4:	84.86	0.8486	13.61	71.87	35,874
Total VOC:	3.70	0.0370	1.88	9.91	4,946
Total HAP:	0.03	0.0003	0.03	0.14	70

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)
 #UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 oF 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	0.138	0.321	160.16	0.166	0.385	192.20
Methane*	75-82-8	CH4	84.856	71.869	35,873.59	99.998	75.000	42,275.00
VOC**	Various	C3 thru C10+	3.702	9.909	4,946.09	4.442	11.891	5,935.31
Benzene***	71-43-2	C6H6	0.0008	0.0033	1.65	0.0010	0.0040	1.98
Ethylbenzene***	100-41-4	C8H10	0.0001	0.0006	0.28	0.0300	0.1500	0.34
n-Hexane***	110-54-3	C6H14	0.0237	0.1078	53.82	0.0284	0.1294	64.59
Toluene***	108-88-3	C7H8	0.0018	0.0088	4.37	0.0022	0.0105	5.24
2,2,4-Trimethylpentane**	540-84-1	C8H18	0.0001	0.0006	0.30	0.0001	0.0007	0.36
Xylenes***	1330-20-7	C8H10	0.0036	0.0202	10.07	0.0300	0.1500	12.09
Total HAP***	Various	C6 thru C8	0.0301	0.1412	70.49	0.0351	0.1648	82.28

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment H - Gas Analysis

Inlet Natural Gas - Certificate of Analysis

J-W Measurement Company
 Canonsburg, PA
 724-749-5180

Good

Customer	: 2259 - WILLIAMS	Date Sampled	: 07/02/2013
Station ID	: 52147-50	Date Analyzed	: 07/11/2013
Cylinder ID	: W1110	Effective Date	: 08/01/2013
Producer	:	Cyl Pressure	: 925
Lease	: DEWHURST MASTER	Temp	: 94
Area	: 500 - OHIO VALLEY MID	Cylinder Type	: Spot
State	: WV	Sample By	: JR

<u>COMPONENT</u>	<u>MOL%</u>	<u>GPM@14.73(PSIA)</u>
Methane	84.8558	0.000
Ethane	10.9436	2.934
Propane	2.5387	0.701
Iso-Butane	0.3342	0.110
Normal-Butane	0.4665	0.147
Iso-Pentane	0.1305	0.048
Normal-Pentane	0.0854	0.031
Nitrogen	0.3574	0.000
Carbon-Dioxide	0.1381	0.000
Oxygen	0.0000	0.000
BENZENE	0.0008	0.000
TOLUENE	0.0018	0.001
ETHYLBENZENE	0.0000	0.000
M-XYLENE/P-XYLENE	0.0000	0.000
2,2-Dimethylbutane	0.0066	0.003
2,3-Dimethylbutane/CycloC5	0.0074	0.003
2-methylpentane	0.0272	0.011
3-methylpentane	0.0172	0.007
Normal-Hexane	0.0237	0.010
2,2-Dimethylpentane	0.0006	0.000
Methylcyclopentane	0.0041	0.001
3,3-Dimethylpentane	0.0027	0.001
CYCLOHEXANE	0.0030	0.001
2-Methylhexane	0.0113	0.005
2,3-Dimethylpentane	0.0027	0.001
3-Methylhexane	0.0076	0.003
1,t3-Dimethylcyclopentane	0.0001	0.000
1,t2-DMCYC5 / 2,2,4-TMC5	0.0002	0.000
N-Heptane	0.0077	0.004
METHYLCYCLOHEXANE	0.0057	0.003
2,5-Dimethylhexane	0.0007	0.000
2,3-Dimethylhexane	0.0008	0.000
2-Methylheptane	0.0028	0.001
4-Methylheptane	0.0011	0.001
3-Methylheptane	0.0017	0.001
1,t4-Dimethylcyclohexane	0.0008	0.000
N-OCTANE / 1,T2-DMCYC6	0.0026	0.001
1,t3-DMCYC6/1,C4-DMCYC6/1,C2.C3-TMCYC5	0.0000	0.000
2,4,4 TMC6	0.0000	0.000
2,6-Dimethylheptane / 1,C2-DMCYC6	0.0005	0.000
Ethylcyclohexane	0.0003	0.000
M-XYLENE	0.0019	0.001
P-XYLENE	0.0016	0.001
O-XYLENE	0.0000	0.000
NONANE	0.0015	0.001
N-DECANE	0.0017	0.001
N-UNDECANE	0.0014	0.001
TOTAL	100.0000	4.034



Wellhead Natural Gas

Safety Data Sheet

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

Revision Date: 10/02/2013

Version: 1.0

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

Product Identifier

Product Form: Mixture

Product Name: Wellhead Natural Gas

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

Intended Use of the Product

Use of the Substance/Mixture: Fuel.

Name, Address, and Telephone of the Responsible Party

Company

Williams, Inc.

One Williams Center

Tulsa, OK 74172, US

T 800-688-7507

enterprise@williams.com

Emergency Telephone Number

Emergency number : 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Simple Asphy

Flam. Gas 1 H220

Compressed gas H280

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



Signal Word (GHS-US) :

Danger

Hazard Statements (GHS-US) :

H220 - Extremely flammable gas

H280 - Contains gas under pressure; may explode if heated

May displace oxygen and cause rapid suffocation

Precautionary Statements (GHS-US) :

P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.

P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 - Eliminate all ignition sources if safe to do so.

P403 - Store in a well-ventilated place.

P410+P403 - Protect from sunlight. Store in a well-ventilated place.

Other Hazards

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

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

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

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

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

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

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

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

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

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

Most Important Symptoms and Effects Both Acute and Delayed

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

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

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

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

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

Chronic Symptoms: Contains a small amount of Hydrogen Sulfide, symptoms of overexposure are headaches, dizziness, nausea, coughing, respiratory irritation, eye irritation, skin irritation, pain in the nose, and loss of consciousness. Heating of the product may release higher amounts of Hydrogen Sulfide (H₂S).

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

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

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

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Special Hazards Arising From the Substance or Mixture

Fire Hazard: Extremely flammable gas

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

Reactivity: Hazardous reactions will not occur under normal conditions.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire

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

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

Hazardous Combustion Products: Carbon oxides (CO, CO₂). Hydrocarbon, sulfur dioxide (SO₂), and Hydrogen sulfide (H₂S) fatal and irritating gases

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

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

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

For Non-Emergency Personnel

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

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Ventilate area.

Environmental Precautions

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

Methods and Material for Containment and Cleaning Up

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

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

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

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

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

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

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

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

Conditions for Safe Storage, Including Any Incompatibilities Not available

Specific End Use(s)

Fuel.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

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

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

Propane (74-98-6)

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

Butane (106-97-8)

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

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

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

Nitrogen (7727-37-9)

Methane (74-82-8)

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

Ethane (74-84-0)

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

Exposure Controls

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

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



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

Hand Protection: Wear chemically resistant protective gloves. Insulated gloves

Eye Protection: Chemical goggles or face shield.

Skin and Body Protection: Not available

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

Thermal Hazard Protection: Wear suitable protective clothing.

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

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State : Gas

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

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Hazardous reactions will not occur under normal conditions.

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

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

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

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

Hazardous Decomposition Products: Carbon oxides (CO, CO₂). hydrocarbons. Sulfur dioxide and hydrogen sulfide are fatal and irritating gases.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity : Not classified

LD50 and LC50 Data Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

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Aspiration Hazard: Not classified

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

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

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

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

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

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

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

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

Persistence and Degradability

Wellhead Natural Gas	
Persistence and Degradability	Not established.

Bioaccumulative Potential

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

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Mobility in Soil Not available

Other Adverse Effects

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

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

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

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

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/DOT/TDG

UN Number

UN-No.(DOT): 1971

DOT NA no.: UN1971

UN Proper Shipping Name

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

Hazard Labels (DOT) : 2.1 - Flammable gases



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

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

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

Additional Information

Emergency Response Guide (ERG) Number : 115

Transport by sea

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

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

Air transport

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

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

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

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

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

Propane (74-98-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Butane (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Carbon dioxide (124-38-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Nitrogen (7727-37-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Methane (74-82-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Ethane (74-84-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Hydrogen sulfide (7783-06-4)
<p>U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute</p> <p>U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic</p> <p>U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)</p> <p>U.S. - Colorado - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues</p> <p>U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)</p> <p>U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)</p> <p>U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities</p> <p>U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities</p> <p>U.S. - Delaware - Accidental Release Prevention Regulations - Toxic Endpoints</p> <p>U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities</p> <p>U.S. - Hawaii - Occupational Exposure Limits - STELs</p> <p>U.S. - Hawaii - Occupational Exposure Limits - TWAs</p> <p>U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations</p> <p>U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)</p> <p>U.S. - Idaho - Occupational Exposure Limits - Acceptable Maximum Peak Above the Ceiling Concentration for an 8-Hour Shift</p> <p>U.S. - Idaho - Occupational Exposure Limits - Ceilings</p> <p>U.S. - Idaho - Occupational Exposure Limits - TWAs</p> <p>U.S. - Louisiana - Reportable Quantity List for Pollutants</p> <p>U.S. - Maine - Air Pollutants - Hazardous Air Pollutants</p> <p>U.S. - Massachusetts - Allowable Ambient Limits (AALs)</p> <p>U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)</p> <p>U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1</p> <p>U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2</p> <p>U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity</p> <p>U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1</p> <p>U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2</p> <p>U.S. - Massachusetts - Right To Know List</p> <p>U.S. - Massachusetts - Threshold Effects Exposure Limits (TELEs)</p> <p>U.S. - Michigan - Occupational Exposure Limits - STELs</p> <p>U.S. - Michigan - Occupational Exposure Limits - TWAs</p> <p>U.S. - Michigan - Polluting Materials List</p> <p>U.S. - Michigan - Process Safety Management Highly Hazardous Chemicals</p> <p>U.S. - Minnesota - Chemicals of High Concern</p> <p>U.S. - Minnesota - Hazardous Substance List</p> <p>U.S. - Minnesota - Permissible Exposure Limits - STELs</p> <p>U.S. - Minnesota - Permissible Exposure Limits - TWAs</p>

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

Propane (74-98-6)

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

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

Butane (106-97-8)

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

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

Carbon dioxide (124-38-9)

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

Nitrogen (7727-37-9)

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

Methane (74-82-8)

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

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

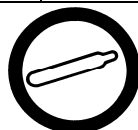
Ethane (74-84-0)

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

Canadian Regulations

Wellhead Natural Gas

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

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

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

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

WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas
----------------------	--

Butane (106-97-8)

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

Listed on the Canadian Ingredient Disclosure List

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

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

Listed on the Canadian Ingredient Disclosure List

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

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

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

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

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

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

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

SECTION 16: OTHER INFORMATION

Revision date : 10/02/2013

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

GHS Full Text Phrases:

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

Party Responsible for the Preparation of This Document

Wellhead Natural Gas

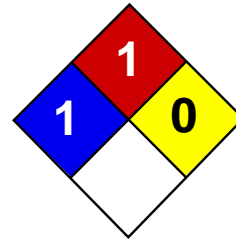
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Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
800-688-7507

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

North America GHS US 2012 & WHMIS



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

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

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

CALGARY, ALBERTA, T2P 2S5

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

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

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

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

(N.Av. = not available N.App. = not applicable)

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

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

SECTION 5 – REACTIVITY DATA

Chemical Stability: Yes **Conditions:** Heat

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

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

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:

Skin Absorption: Yes

Skin Contact: Yes (liquid)

Eye Contact: Yes

Inhalation: Acute: Yes

Chronic: Yes

Ingestion: Yes

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

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

Sensitization to Product: N.Av.

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

Irritancy: Yes

Synergistic Materials: None reported

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

SECTION 7 – PREVENTIVE MEASURES

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

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

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

Eye: Chemical splash goggles

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

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

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

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

Waste Disposal: Contact appropriate regulatory authorities for disposal requirements.

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

Avoid sparking conditions.

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

Special Shipping Information: N.Av.

SECTION 8 – FIRST AID MEASURES

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

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

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

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

SECTION 9 – PREPARATION DATE OF MSDS

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

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

ATTACHMENT I

Emission Units Table

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

- **Emissions Unit Table**
-

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
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Attachment I

EMISSION UNITS TABLE

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

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed/Modified	Design Capacity	Type ³ and Date of Change	Control Device ⁴
DFT-01	1E	Dehydrator 01 Flash Tank (≥ 50% Recycle)	2013 / tbd	12.5 MMscfd	Existing	na
DSV-01	2E	Dehydrator 01 Regenerator/Still Vent	2013 / tbd	12.5 MMscfd	Existing	na
RBV-01	3E	Reboiler Vent	2013 / na	0.30 MMBtu/hr	Existing	na
T-01	4E	Storage Tank (Produced Water)	tbd	210 bbl	NEW	na
TLO	5E	Truck Load-Out (Produced Water)	tbd	2,520 bbl/yr	NEW	na
FUG	1F	Piping and Equipment Fugitives (Gas and Water/Oil)	2013 / na	1,743 Fittings	Existing	na

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

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

³ New, modification, removal, etc.

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

ATTACHMENT J

Emission Points Data Summary Sheet

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

- **Table 1 – Emissions Data**
 - Dehydrator 01 - Flash-Tank (DSV-01/1E)
 - Dehydrator 01 - Regenerator/Still Vent (DSV-01/2E)
 - Reboiler 01 (RBV-01/3E)
 - Storage Tank 01 - Produced Water (T-01/4E)
 - Truck Load-Out - Produced Water (TLO/5E)
 - **Table 2 – Release Parameter Data**
-

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Attachment J - Emission Points Data Summary Sheet
Dehydrator 01 - Flash-Tank (DSV-01/1E)

Table 1: Emissions Data															
Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission 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			
DFT-01/1E								NOX	---	---	---	---	Gas	---	
	12.5 MMscfd Dehydrator 01 (Flash Tank w/ ≥ 50% Recycle) (DFT-01/1E)							CO	---	---	---	---	Gas	---	
	Upward Vertical	DFT-01/1E	DFT-01/1E	na	na	C	8,760	VOC	1.23	5.38	1.23	5.38	Gas	GLYCalc	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	7.2E-03	0.03	7.2E-03	0.03	Gas	GLYCalc	
								Ethylbenzene	1.4E-03	6.2E-03	1.4E-03	6.2E-03	Gas	GLYCalc	
								HCHO	---	---	---	---	Gas	GLYCalc	
								n-Hexane	0.03	0.12	0.03	0.12	Gas	GLYCalc	
								Methanol	---	---	---	---	Gas	---	
								Toluene	0.02	0.10	0.02	0.10	Gas	GLYCalc	
								2,2,4-TMP	1.4E-04	6.0E-04	1.4E-04	6.0E-04	Gas	GLYCalc	
								Xylenes	0.05	0.23	0.05	0.23	Gas	GLYCalc	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	0.11	0.49	0.11	0.49	Gas	Sum	
								CO2	17.52	76.74	17.52	76.74	Gas	GLYCalc	
								CH4	3.74	16.38	3.74	16.38	Gas	GLYCalc	
								N2O	---	---	---	---	Gas	---	
								CO2e	111	486	111	486	Gas	Wgt Sum	

Continued ...

DEWHURST DEHYDRATION STATION

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Attachment J - Emission Points Data Summary Sheet**Dehydrator 01 - Regenerator/Still Vent (DSV-01/2E)****Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
DSV-01/2E	Upward Vertical	12.5 MMscfd Dehydrator 01 (Regenerator/Still Vent) (DSV-01/2E)						NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	2.32	10.15	2.32	10.15	Gas	GLYCalc	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	0.07	0.30	6.8E-02	0.30	Gas	GLYCalc	
								Ethylbenzene	0.03	0.13	3.0E-02	1.3E-01	Gas	GLYCalc	
								HCHO	---	---	---	---	Gas	GLYCalc	
								n-Hexane	0.01	0.05	1.1E-02	4.8E-02	Gas	GLYCalc	
								Methanol	---	---	---	---	Gas	---	
								Toluene	0.30	1.32	3.0E-01	1.32	Gas	GLYCalc	
								2,2,4-TMP	5.5E-05	2.4E-04	5.5E-05	2.4E-04	Gas	GLYCalc	
								Xylenes	1.56	6.84	1.56	6.84	Gas	GLYCalc	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	1.97	8.63	1.97	8.63	Gas	Sum	
								CO2	0.01	0.03	0.01	0.03	Gas	GLYCalc	
								CH4	0.07	0.29	0.07	0.29	Gas	GLYCalc	
								N2O	---	---	---	---	Gas	---	
								CO2e	2	7	1.67	7	Gas	Wgt Sum	

Continued ...

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Attachment J - Emission Points Data Summary Sheet
Dehydrator Reboiler 01 (RBV-01/3E)

Table 1: Emissions Data															
Emission Point ID No. <i>(Must match Emission Units Table & Plot Plan)</i>	Emission Point Type ¹	Emission Unit Vented Through This Point <i>(Must match Emission Units Table & Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table & Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS ³ <i>(Speciate VOCs & HAPS)</i>	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used ⁶	Emission Concentration ⁷ <i>(ppmv or mg/m³)</i>
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RBV-01/3E								NOX	0.03	0.13	0.03	0.13	Gas	AP-42	
	0.3 MMBtu/hr Dehydrator Reboiler 01 (RBV-01/3E)							CO	0.02	0.11	0.02	0.11	Gas	AP-42	
	Upward Vertical	RBV-01/3E	RBV-01/3E	na	na	C	8,760	VOC	1.7E-03	0.01	1.7E-03	0.01	Gas	AP-42	
								SO2	1.8E-04	7.7E-04	1.8E-04	7.7E-04	Gas	AP-42	
								PM10/2.5	2.2E-03	0.01	2.2E-03	0.01	Solid/Gas	AP-42	
								Benzene	6.2E-07	2.7E-06	6.2E-07	2.7E-06	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	AP-42	
								HCHO	2.2E-05	9.7E-05	2.2E-05	9.7E-05	Gas	AP-42	
								n-Hexane	5.3E-04	2.3E-03	5.3E-04	2.3E-03	Gas	AP-42	
								Methanol	---	---	---	---	Gas	AP-42	
								Toluene	1.0E-06	4.4E-06	1.0E-06	4.4E-06	Gas	AP-42	
								2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	---	---	---	---	Gas	AP-42	
								Other HAP	5.6E-07	2.4E-06	5.6E-07	2.4E-06	Gas	AP-42	
								Total HAP	5.5E-04	2.4E-03	5.5E-04	2.4E-03	Gas	Sum	
								CO2	35	155	35	155	Gas	AP-42	
								CH4	6.8E-04	3.0E-03	6.8E-04	3.0E-03	Gas	AP-42	
								N2O	6.5E-04	2.8E-03	6.5E-04	2.8E-03	Gas	AP-42	
								CO2e	36	156	36	156	Gas	Wgt Sum	

Continued ...

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment J - Emission Points Data Summary Sheet
Produced Water Storage Tank 01 (T-01/4E)

Table 1: Emissions Data															
Emission Point ID No. <i>(Must match Emission Units Table & Plot Plan)</i>	Emission Point Type ¹	Emission Unit Vented Through This Point <i>(Must match Emission Units Table & Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table & Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS ³ <i>(Speciate VOCs & HAPS)</i>	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used ⁶	Emission Concentration ⁷ <i>(ppmv or mg/m³)</i>
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
T-01/4E								NOX	---	---	---	---	Gas	---	
	210 bbl Produced Water Storage Tank (T-01/4E)							CO	---	---	---	---	Gas	---	
	Upward Vertical	T-01/4E	T-01/4E	na	na	C	8,760	VOC	0.02	0.07	0.02	0.07	Gas	EPA	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	EPA	
								Ethylbenzene	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	EPA	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	7.5E-04	3.3E-03	7.5E-04	3.3E-03	Gas	EPA	
								Methanol	---	---	---	---	Gas	---	
								Toluene	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	EPA	
								2,2,4-TMP	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	EPA	
								Xylenes	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	EPA	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	1.5E-03	0.01	1.5E-03	0.01	Gas	Sum	
								CO2	0.04	0.19	0.04	0.19	Gas	---	
								CH4	0.01	0.06	0.01	0.06	Gas	---	
								N2O	---	---	---	---	Gas	---	
								CO2e	0.37	1.62	0.37	1.62	Gas	---	

Continued ...

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment J - Emission Points Data Summary Sheet
Produced Water - Truck Load-Out (TLO/5E)

Table 1: Emissions Data															
Emission Point ID No. <i>(Must match Emission Units Table & Plot Plan)</i>	Emission Point Type ¹	Emission Unit Vented Through This Point <i>(Must match Emission Units Table & Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table & Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS ³ <i>(Speciate VOCs & HAPS)</i>	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used ⁶	Emission Concentration ⁷ <i>(ppmv or mg/m³)</i>
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
TLO/5E								NOX	---	---	---	---	Gas	---	
	Truck Load-Out - Produced Water (TLO/5E)							CO	---	---	---	---	Gas	---	
	Upward Vertical	TLO/5E	TLO/5E	na	na	I	na	VOC	---	0.08	---	0.08	Gas	AP-42	
								SO2	---	---	---	---	Gas	---	
								PM10/2.5	---	---	---	---	Solid/Gas	---	
								Benzene	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								Ethylbenzene	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								HCHO	---	---	---	---	Gas	---	
								n-Hexane	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								Methanol	---	---	---	---	Gas	---	
								Toluene	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								2,2,4-TMP	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								Xylenes	---	1.7E-03	---	1.7E-03	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	---	
								Total HAP	---	0.01	---	0.01	Gas	Sum	
								CO2	---	---	---	---	Gas	---	
								CH4	---	---	---	---	Gas	---	
								N2O	---	---	---	---	Gas	---	
								CO2e	---	---	---	---	Gas	---	

Continued ...

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment J - Emission Points Data Summary Sheet

FACILITY-WIDE SUMMARY

Table 1: Emissions Data - Continued															
Emission Point ID No. <i>(Must match Emission Units Table & Plot Plan)</i>	Emission Point Type ¹	Emission Unit Vented Through This Point <i>(Must match Emission Units Table & Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table & Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS ³ <i>(Speciate VOCs & HAPS)</i>	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used ⁶	Emission Concentration ⁷ <i>(ppmv or mg/m³)</i>
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
na								NOX	0.03	0.13	0.03	0.13	Gas	Sum	
	FACILITY-WIDE SUMMARY (Including Fugitives (FUG/1F))							CO	0.02	0.11	0.02	0.11	Gas	Sum	
								Point - VOC	3.56	15.69	3.56	15.69	Gas	Sum	
								Fugitive - VOC	1.02	4.45	1.02	4.45	Gas	Sum	
								Total - VOC	4.58	20.14	4.58	20.14	Gas	Sum	
								SO2	1.8E-04	7.7E-04	1.8E-04	7.7E-04	Gas	Sum	
								PM10/2.5	2.2E-03	0.01	2.2E-03	0.01	Gas	Sum	
								Benzene	0.08	0.36	0.08	0.36	Gas	Sum	
								Ethylbenzene	0.04	0.17	0.04	0.17	Solid/Gas	Sum	
								HCHO	2.2E-05	9.7E-05	2.2E-05	9.7E-05	Gas	Sum	
								n-Hexane	0.07	0.32	0.07	0.32	Gas	Sum	
								Methanol	---	---	---	---	Gas	Sum	
								Toluene	0.33	1.45	0.33	1.45	Gas	Sum	
								2,2,4-TMP	0.01	0.03	0.01	0.03	Gas	Sum	
								Xylenes	1.62	7.10	1.62	7.10	Gas	Sum	
								Other HAP	5.6E-07	2.4E-06	5.6E-07	2.4E-06	Gas	Sum	
								Total HAP	2.15	9.42	2.15	9.42	Gas	Sum	
								CO2	53	232	53	232	Gas	Sum	
								CH4	7	29	7	29	Gas	Sum	
								N2O	6.5E-04	2.8E-03	6.5E-04	2.8E-03	Gas	Sum	
								CO2e	216	948	216	948	Gas	Sum	

Continued ...

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Attachment J - Emission Points Data Summary Sheet

Table 1 Notes

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

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

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

Table 1: Notes

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

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

Attachment J - Emission Points Data Summary Sheet

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

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS

1.) Will there be haul road activities?

☐ Yes ☒ No

☐ If Yes, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.

2.) Will there be Storage Piles?

☐ Yes ☒ No

☐ If Yes, then complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.

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

☒ Yes ☐ No --- Truck Load-Out (TLO/5E) is included in Point Source Emissions ---

☐ If Yes, then complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.

4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?

☐ Yes ☒ No

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

5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)?

☒ Yes ☐ No

☒ If Yes, then complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.

6.) Will there be General Clean-up VOC Operations?

☐ Yes ☒ No

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

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

☐ Yes ☒ No

☐ If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.

If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

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Attachment K - Fugitive Emissions

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions.

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 Point Source Emissions ---					
Wastewater Treatment	na	---	---	---	---	---
Equipment Leaks (FUG/1F)	VOC	1.02	4.45	1.02	4.45	AP-42
	Benzene	0.01	0.03	0.01	0.03	AP-42
	Ethylbenzene	0.01	0.03	0.01	0.03	AP-42
	Formaldehyde (HCHO)	---	---	---	---	---
	n-Hexane	0.03	0.15	0.03	0.15	AP-42
	Methanol (MeOH)	---	---	---	---	---
	Toluene	0.01	0.03	0.01	0.03	AP-42
	2,2,4-TMP (i-Octane)	0.01	0.03	0.01	0.03	AP-42
	Xylenes	0.01	0.03	0.01	0.03	AP-42
	Other HAP	---	---	---	---	---
	Total HAP	0.06	0.28	0.06	0.28	Sum
	CO2	0.01	0.06	0.01	0.06	MB
	CH4	2.72	11.90	2.72	11.90	MB
	N2O	---	---	---	---	---
	CO2e	68	297	68	297	Wgt Sum
General Clean-up VOC Emissions	na	---	---	---	---	---
Other	na	---	---	---	---	---

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, 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 - Fugitive Emissions

DESCRIPTION OF FUGITIVE EMISSIONS

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (Days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	Light Liquid VOC ^{6,7}				
	Heavy Liquid VOC ⁸				
	Non-VOC ⁹				
Valves ¹⁰	Gas VOC		<p style="text-align: center;">This Facility is NOT Subject to Leak Detection and Repair (LDAR) Regulations.</p> <p style="text-align: center;">Please Reference the Fugitive Emissions Summary Data Sheet .</p>		
	Light Liquid VOC				
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves ¹¹	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Open Ended Lines ¹²	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Sampling Connections ¹³	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Compressors	Gas VOC				
	Non-VOC				
Flanges / Connectors	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
Other*	Gas VOC				
	Light Liquid VOC				
	Non-VOC				
				TOTAL (lb/yr)	8,892
				TOTAL (tpy)	4.45

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

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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; EPA - emission factors established by EPA (cite document used);
EE - engineering estimate; 0 - other method, such as in-house emission factor (specify).
5. Do not include in the equipment count seal-less pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
6. Volatile organic compounds (VOC) means the term as defined in 40 CFR. 51.100 (s).
7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a light liquid.
8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C. then the fluid is defined as a heavy liquid.
9. LIST CO, H₂S, mineral acids, NO, SO, etc. DO NOT LIST H, H₂O, N, O, and Noble Gases.
10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
13. Do not include closed-purge sampling connections.

ATTACHMENT L

Emissions Unit Data Sheet(s)

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

- Natural Gas Glycol Dehydration - Emission Unit Data Sheet
 - 40 CFR Part 63; Subpart HH & HHH Registration Form
 - Storage Tank - Data Sheet
 - Storage Tank 01 - Emission Unit Data Sheet
 - Storage Tank 01 - ProMax Model Results
 - Bulk Liquid Transfer Operations - Emission Unit Data Sheet
-

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Attachment L - Emission Unit Data Sheets

NATURAL GAS GLYCOL DEHYDRATION UNIT DATA SHEET

General Glycol Dehydration Unit Data		Station Name		DEWHURST DS	
		Manufacturer and Model		---	
		Max Dry Gas Flow Rate (MMscf/day)		12.50	
		Design Heat Input (MMBtu/hr) - HHV		0.30	
		Design Type (DEG or TEG)		TEG	
		Source Status ²		ES	
		Date Installed/Modified/Removed ³		2013	
		Regenerator Still Vent APCD ⁴		NA	
		Fuel HV (Btu/scf) - 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
Dehydrator 01	Flash Tank (DFT-01/1E) and Still Vent (DSV-01/2E) Combined	GRI-GLYCalc	VOC	3.55	15.53
		GRI-GLYCalc	Benzene	0.07	0.33
		GRI-GLYCalc	Ethylbenzene	3.1E-02	1.4E-01
		GRI-GLYCalc	n-Hexane	0.04	0.17
		GRI-GLYCalc	Toluene	0.32	1.42
		GRI-GLYCalc	2,2,4-TMP	1.9E-04	8.4E-04
		GRI-GLYCalc	Xylenes	1.61	7.07
		Sum	Total HAP	2.08	9.12
		GRI-GLYCalc	CO ₂	17.53	76.77
		GRI-GLYCalc	CH ₄	4	17
		Weighted Sum	CO ₂ e	113	494
Reboiler Vent 01	RBV-01/3E	AP-42	NOX	0.03	0.13
		AP-42	CO	0.02	0.11
		AP-42	VOC	1.7E-03	0.01
		AP-42	SO ₂	1.8E-04	7.7E-04
		AP-42	PM _{10/2.5}	2.2E-03	0.01
		AP-42	Benzene	6.2E-07	2.7E-06
		AP-42	Ethylbenzene	---	---
		AP-42	HCHO	2.2E-05	9.7E-05
		AP-42	n-Hexane	5.3E-04	0.00
		AP-42	Methanol	---	---
		AP-42	Toluene	1.0E-06	4.4E-06
		AP-42	2,2,4-TMP	---	---
		AP-42	Xylenes	---	---
		AP-42	Other HAP	5.6E-07	2.4E-06
		Sum	Total HAP	5.5E-04	2.4E-03
		AP-42	CO ₂	35	155
		AP-42	CH ₄	6.8E-04	3.0E-03
		AP-42	N ₂ O	6.5E-04	2.8E-03
		Weighted Sum	CO ₂ e	36	156

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Attachment L - Emission Unit Data Sheets

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.**

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Attachment L - Emission Unit Data Sheets

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):	12.5 MMscfd	
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"/> prior to the point of custody transfer and there is no NG processing plant <input type="checkbox"/> 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		

Section B: Dehydration Unit (if applicable)¹			
Description: 12.5 MMscfd - Dehydrator 01 (DFT-01/1E and DSV-01/2E) and Reboiler 01 (RBV-01/3E)			
Date of Installation:	2013	Annual Operating Hours:	8,760
Exhaust Stack Height (ft):	12.0	Stack Diameter (ft):	0.6
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
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:	58 oF	Gas Pressure: 600 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:	12.5 MMscfd
(Downstream of Contact Tower)	Water Content:	7.0 lb/MMscf	
Lean Glycol:	Circulation Rate:	Actual ³ :	0.67 gpm
	Pump make/model:	Kimray 4020PV	
Glycol Flash Tank (if applicable):	Temp:	170.0 oF	Press: 38.0 psig
	If no, describe vapor control:	A minimum of 50% of the Flash Tank off-gas is recycled as fuel in the reboiler.	
Stripping Gas (if applicable):	Source of Gas	na	Rate: na

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Attachment L - Emission Unit Data Sheets

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 - STORAGE TANK DATA SHEET

[illegible]

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

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

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

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), 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 DEWHURST DEHYDRATION STATION	2. Tank Name 210 BBL PRODUCED WATER TANK
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) T-01	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 4E
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) NA	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). NA	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): NA	

II. TANK INFORMATION (required)

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

13A. Maximum annual throughput (gal/yr) 106,000	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) 100	
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) NA	17B. Number of transfers into system per year NA
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> 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 type="checkbox"/> Other (describe)		
20A. Shell Color	20B. Roof Color	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input 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 type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): to		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for Floating Roof Tanks <input type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
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		
PIPE 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 type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

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

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

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

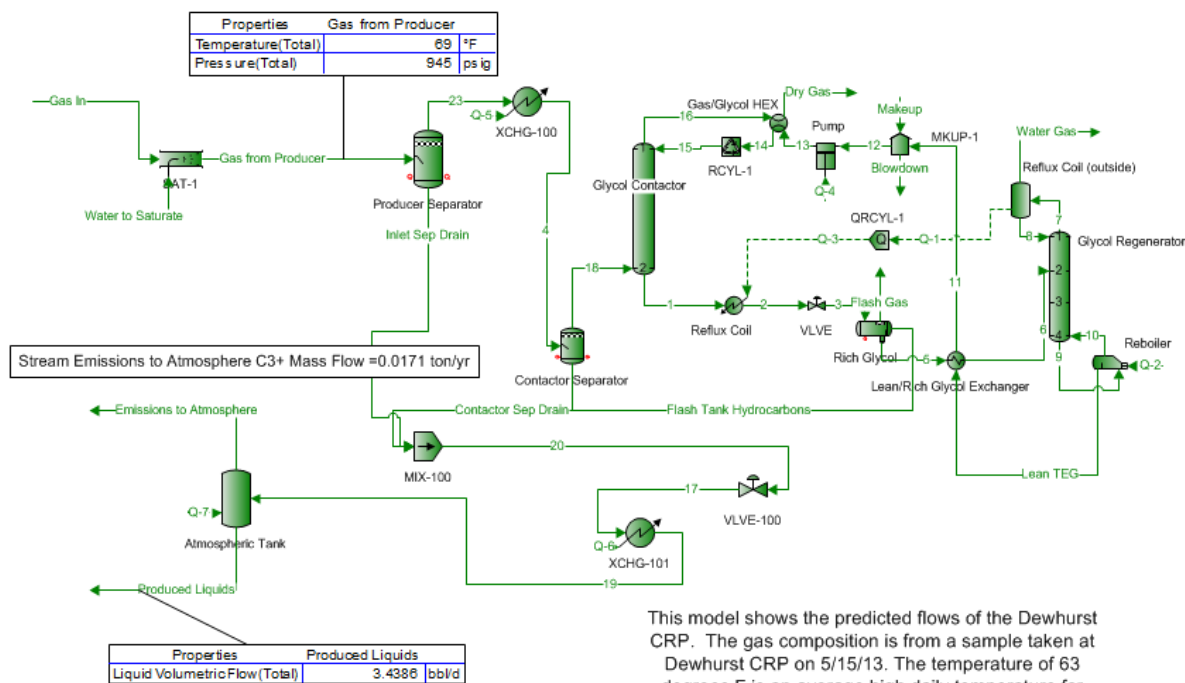
34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°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)			

DEWHURST DEHYDRATION STATION

Application for 45CSR13 NSR Modification Permit

Attachment L - Emission Unit Data Sheets

Tank 01/4E Flash Emissions - ProMax



This model shows the predicted flows of the Dewhurst CRP. The gas composition is from a sample taken at Dewhurst CRP on 5/15/13. The temperature of 63 degrees F is an average high daily temperature for Morgantown, WV. Atmospheric pressure is assumed to be 14.7 psia.

Component	lb/hr	tons/year	
Water	1.3E-03	5.6E-03	
TEG	0.0E+00	0.0E+00	
Nitrogen	2.2E-04	9.6E-04	
CO2	3.2E-03	1.4E-02	
Methane	5.0E-02	2.2E-01	
Ethane	9.7E-03	4.2E-02	
Propane	3.0E-03	1.3E-02	
i-Butane	1.5E-04	6.8E-04	
n-Butane	4.5E-04	2.0E-03	
i-Pentane	8.7E-05	3.8E-04	
n-Pentane	5.7E-05	2.5E-04	
Cyclohexane	1.3E-05	5.5E-05	
Heptane	1.1E-05	4.7E-05	
Octane	3.3E-06	1.5E-05	
Nonane	1.5E-06	6.4E-06	
Decane	4.7E-08	2.0E-07	
Benzene	2.4E-05	1.0E-04	0.6%
Ethylbenzene	0.0E+00	0.0E+00	0.0%
Hexane	2.0E-05	9.0E-05	0.5%
Toluene	5.8E-05	2.5E-04	1.5%
m-Xylene	2.8E-05	1.2E-04	0.7%
TOTAL	6.8E-02	3.0E-01	
TPH	6.3E-02	2.8E-01	
VOC	3.9E-03	1.7E-02	100.0%
HAP	1.3E-04	5.7E-04	3.3%

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/5E				
1. Loading Area Name: DEWHURST DEHYDRATION STATION				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply): N/A <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: N/A				
6. Are cargo vessels pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, describe: N/A				
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)	106					
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)	169				
Estimation Method ⁵	EPA					
¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill						
² At maximum bulk liquid temperature						
³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)						
⁴ List as many as apply (complete and submit appropriate <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.

ATTACHMENT M
Air Pollution Control Device Sheet(s)
(NOT APPLICABLE)

ATTACHMENT N

Supporting Emissions Calculations

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

- **Emission Summary Spreadsheets**
 - Controlled Emissions - Criteria Pollutants
 - Controlled Emissions - Hazardous Air Pollutants (HAP)
 - Greenhouse Gas (GHG) Emissions
 - PRE-Controlled Emissions - Criteria Pollutants
 - PRE-Controlled Emissions - Hazardous Air Pollutants (HAP)
 - **Unit-Specific Emission Spreadsheets**
 - Dehydrator 01 (Flash Tank (DFT-01/1E) and Regenerator/Still Vent (DSV-01/2E))
 - Dehydrator 01 (Combined) – 12.5 MMscfd
 - Reboiler 01 – 0.30 MMBtu/hr (RBV-01/3E)
 - Storage Tank - Produced Water (T-01/4E)
 - Truck Load-Out - Produced Water (TLO/5E)
 - Piping and Equipment Fugitives - Gas & Water/Oil (FUG /1F)
 - **AP-42 and GHG Emission Factors**
 - **Model Results - Dehydrator 01 - GRI-GLYCalc 4.0**
 - Summary of Emissions
 - Summary of Input Values
 - TEG Dehydration Flow Sheet
 - Aggregate Calculations Report
-

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

Controlled Emissions - Criteria Pollutants

Unit ID	Point ID	Control ID	Description	Design Capacity	NOx		CO		VOC		SOx		PM10/2.5	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
DFT-01	1E	na	TEG Dehydrator - Flash Tank	12.5 MMscfd	---	---	---	---	1.23	5.38	---	---	---	---
DSV-01	2E	na	TEG Dehydrator - Still Vent	12.5 MMscfd	---	---	---	---	2.32	10.15	---	---	---	---
RBV-01	3E	na	TEG Dehydrator - Reboiler Vent	0.30 MMBtu/hr	0.03	0.13	0.02	0.11	1.7E-03	0.01	1.8E-04	7.7E-04	2.2E-03	0.01
T-01	4E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.07	---	---	---	---
TLO	5E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.08	---	---	---	---
TOTAL POINT SOURCE PTE:					0.03	0.13	0.02	0.11	3.56	15.69	1.8E-04	7.7E-04	2.2E-03	0.01
Title V Permit Threshold:					---	100	---	100	---	100	---	100	---	100

FUG	1F	na	Process Piping Fugitives - Gas	1,158 fittings	---	---	---	---	0.43	1.89	---	---	---	---
		na	Process Piping Fugitives - Water/Oil	585 fittings	---	---	---	---	0.58	2.56	---	---	---	---
TOTAL FUGITIVE (FUG/1F) PTE:					---	---	---	---	1.02	4.45	---	---	---	---

TOTAL PTE:	0.03	0.13	0.02	0.11	4.58	20.14	1.8E-04	7.7E-04	2.2E-03	0.01
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- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Truck Load-Out (TLO/5E) emission generating activities are infrequent.
 2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).
 3 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
4 - Fugitive criteria pollutant emissions from dehydration stations are not considered in major source determinations (45CSR30 Section 2.26.b.)

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
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Attachment N - Supporting Emissions Calculations

Controlled Emissions - Hazardous Air Pollutants (HAP)

Unit ID	Point ID	Benzene		Ethylbenzene		HCHO (HAP)		n-Hexane		Methanol		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
DFT-01	1E	7.2E-03	0.03	1.4E-03	6.2E-03	---	---	0.03	0.12	---	---	0.02	0.10	1.4E-04	6.0E-04	0.05	0.23	---	---	0.11	0.49
DSV-01	2E	6.8E-02	0.30	3.0E-02	1.3E-01	---	---	1.1E-02	4.8E-02	---	---	3.0E-01	1.32	5.5E-05	2.4E-04	1.56	6.84	---	---	1.97	8.63
RBV-01	3E	6.2E-07	2.7E-06	---	---	2.2E-05	9.7E-05	5.3E-04	2.3E-03	---	---	1.0E-06	4.4E-06	---	---	---	---	5.6E-07	2.4E-06	5.5E-04	2.4E-03
T-01	4E	1.5E-04	6.6E-04	1.5E-04	6.6E-04	---	---	7.5E-04	3.3E-03	---	---	1.5E-04	6.6E-04	1.5E-04	6.6E-04	1.5E-04	6.6E-04	---	---	1.5E-03	0.01
TLO	5E	---	1.7E-03	---	1.7E-03	---	---	---	1.7E-03	---	---	---	1.7E-03	---	1.7E-03	---	1.7E-03	---	---	---	0.01
Subtotal:		0.08	0.33	0.03	0.14	2.2E-05	9.7E-05	0.04	0.17	---	---	0.32	1.42	3.4E-04	0.00	1.61	7.07	5.6E-07	2.4E-06	2.08	9.14

FUG	1F	2.6E-04	1.1E-03	2.6E-04	1.1E-03	---	---	4.7E-03	0.02	---	---	2.6E-04	1.1E-03	2.6E-04	1.1E-03	2.6E-04	1.1E-03	---	---	0.01	0.03
		0.01	0.03	0.01	0.03	---	---	0.03	0.13	---	---	0.01	0.03	0.01	0.03	0.01	0.03	---	---	0.06	0.26
	Subtotal:		0.01	0.03	0.01	0.03	---	---	0.03	0.15	---	---	0.01	0.03	0.01	0.03	0.01	0.03	---	---	0.06

TOTAL PTE:		0.08	0.36	0.04	0.17	2.2E-05	9.7E-05	0.07	0.32	---	---	0.33	1.45	0.01	0.03	1.62	7.10	5.6E-07	2.4E-06	2.15	9.42
Title V:		---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	10	---	25

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Truck Load-Out (TLO/5E) emission generating activities are infrequent.
 2 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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

Greenhouse Gas (GHG) Emissions

Unit ID	Point ID	Control ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation	kg/MMBtu: 53.06 GWP: 1 CO2 CO2e tpy tpy	kg/MMBtu: 1.00E-03 GWP: 25 CH4 CO2e tpy tpy	kg/MMBtu: 1.00E-04 GWP: 298 N2O CO2e tpy tpy	TOTAL CO2e
DFT-01	1E	na	TEG Dehydrator - Flash Tank	---	8,760	76.7476.74	16.38410	------	486
DSV-01	2E	na	TEG Dehydrator - Still Vent	---	8,760	0.030.03	0.297	------	7
RBV-01	3E	na	TEG Dehydrator - Reboiler Vent	0.30	8,760	155155	0.000.1	0.000.84	156
T-01	4E	na	Storage Tank - Produced Water	---	---	0.190.2	0.061	------	2
TLO	5E	na	Truck Load-Out - Produced Water	---	---	------	------	------	---
TOTAL POINT SOURCE PTE:									651

FUG	1F	na	Process Piping Fugitives - Gas	---	8,760	0.06	0.06	12	297	---	---	297
		na	Process Piping Fugitives - Water/Oil	---	---	---	---	---	---	---	---	---
TOTAL FUGITIVE (FUG/1F) PTE:												297

TOTAL FACILITY-WIDE PTE:

232

29

2.8E-03

948

Title V Permit Threshold:

na

na

na

na

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

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION STATION
 Application for 45CSR13 NSR Modification Permit
Attachment N - Supporting Emissions Calculations
PRE-Controlled Emissions - Criteria Pollutants

Unit ID	Point ID	Control ID	Description	Design Capacity	NOx		CO		VOC		SOx		PM10/2.5	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
DFT-01	1E	na	TEG Dehydrator - Flash Tank	12.5 MMscfd	---	---	---	---	1.23	5.38	---	---	---	---
DSV-01	2E	na	TEG Dehydrator - Still Vent	12.5 MMscfd	---	---	---	---	2.32	10.15	---	---	---	---
RBV-01	3E	na	TEG Dehydrator - Reboiler Vent	0.30 MMBtu/hr	0.03	0.13	0.02	0.11	1.67E-03	0.01	1.8E-04	7.7E-04	2.2E-03	0.01
T-01	4E	na	Storage Tank - Produced Water	210 bbl	---	---	---	---	0.02	0.07	---	---	---	---
TLO	5E	na	Truck Load-Out - Produced Water	2,520 bbl/yr	---	---	---	---	---	0.08	---	---	---	---
TOTAL POINT SOURCE PTE:					0.03	0.13	0.02	0.11	3.56	15.69	1.8E-04	7.7E-04	2.2E-03	0.01

FUG	1F	na	Process Piping Fugitives - Gas	1,158 fittings	---	---	---	---	0.43	1.89	---	---	---	---
		na	Process Piping Fugitives - Water/Oil	585 fittings	---	---	---	---	0.58	2.56	---	---	---	---
TOTAL FUGITIVE (FUG/1F) PTE:					---	---	---	---	1.02	4.45	---	---	---	---

TOTAL PTE:	0.03	0.13	0.02	0.11	4.58	20.14	1.8E-04	7.7E-04	2.2E-03	0.01
WV-DEP Permit Threshold:	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	6 lb/hr <u>AND</u> 10 tpy	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

- Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Start/Stop/Maintenance (SSM) and Truck Load-Out (TLO) emission generating activities are infrequent.
 2 - VOC is volatile organic compounds, as defined by EPA, and includes HCHO (formaldehyde).
 3 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.

Williams Ohio Valley Midstream LLC
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Attachment N - Supporting Emissions Calculations

PRE-Controlled Emissions - Hazardous Air Pollutants (HAP)

Unit ID	Point ID	Benzene		Ethylbenzene		HCHO (HAP)		n-Hexane		Methanol		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
DFT-01	1E	7.2E-03	0.03	1.4E-03	0.01	---	---	0.03	0.12	---	---	0.02	0.10	1.4E-04	6.0E-04	0.05	0.23	---	---	0.11	0.49
DSV-01	2E	0.07	0.30	0.03	0.13	---	---	0.01	0.05	---	---	0.30	1.32	5.5E-05	2.4E-04	1.56	6.84	---	---	1.97	8.63
RBV-01	3E	6.2E-07	2.7E-06	---	---	2.2E-05	9.7E-05	5.3E-04	2.3E-03	---	---	1.0E-06	4.4E-06	---	---	---	---	5.6E-07	2.4E-06	5.5E-04	2.4E-03
T-01	4E	1.5E-04	0.00	1.5E-04	0.00	---	---	7.5E-04	0.00	---	---	1.5E-04	0.00	1.5E-04	0.00	1.5E-04	0.00	---	---	0.00	0.01
TLO	5E	---	0.00	---	0.00	---	---	---	0.00	---	---	---	0.00	---	0.00	---	0.00	---	---	---	0.01
Subtotal:		0.08	0.33	0.03	0.14	2.2E-05	9.7E-05	0.04	0.17	---	---	0.32	1.42	3.4E-04	0.00	1.61	7.07	5.6E-07	2.4E-06	2.08	9.14
FUG	1F	2.6E-04	1.1E-03	2.6E-04	1.1E-03	---	---	4.7E-03	0.02	---	---	2.6E-04	1.1E-03	2.6E-04	1.1E-03	2.6E-04	1.1E-03	---	---	6.0E-03	0.03
		0.01	0.03	0.01	0.03	---	---	0.03	0.13	---	---	0.01	0.03	0.01	0.03	0.01	0.03	---	---	0.06	0.26
Subtotal:		0.01	0.03	0.01	0.03	---	---	0.03	0.15	---	---	0.01	0.03	0.01	0.03	0.01	0.03	---	---	0.06	0.28
TOTAL PTE:		0.08	0.36	0.04	0.17	2.2E-05	9.7E-05	0.07	0.32	---	---	0.33	1.45	0.01	0.03	1.62	7.10	5.6E-07	2.4E-06	2.15	9.42
WV-DEP:		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 0.5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy		2 lb/hr <u>OR</u> 5 tpy	

Notes: 1 - Emissions are based on operation at 100% of rated load for 8,760 hrs/yr; except that Truck Load-Out (TLO/5E) emission generating activities are infrequent.
 2 - HCHO is formaldehyde; Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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Dehydrator 01 (Flash Tank (DFT-01/1E) and Regenerator/Still Vent (DSV-01/2E))

Unit ID	Description	Reference	Pollutant	Pre-Control - GLYCalc		Pre-Control x 120%		Control Eff	Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy	%	lb/hr	tpy
DFT-01/1E	Dehydrator 01 Flash Tank (DFT-01/1E) (Minimum of 50% Flash Tank Off-Gas is used as Fuel in the Reboiler) 12.5 MMscfd 8,760 Hr/yr 0.52 MMscf/hr 4,563 MMscf/yr NESHAP HH - Exempt	---	NOX	---	---	---	---	---	---	---
		---	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	VOC	1.02	4.49	1.23	5.38	---	1.23	5.38
		---	SO2	---	---	---	---	---	---	---
		---	PM10/2.5	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Benzene	6.0E-03	0.03	7.2E-03	0.03	---	7.2E-03	0.03
		GRI-GLYCalc 4.0	Ethylbenzene	1.2E-03	5.2E-03	1.4E-03	6.2E-03	---	1.4E-03	6.2E-03
		---	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	0.02	0.10	0.03	0.12	---	0.03	0.12
		GRI-GLYCalc 4.0	Methanol	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Toluene	0.02	0.08	0.02	0.10	---	0.02	0.10
		GRI-GLYCalc 4.0	2,2,4-TMP	1.1E-04	5.0E-04	1.4E-04	6.0E-04	---	1.4E-04	6.0E-04
		GRI-GLYCalc 4.0	Xylenes	0.04	0.19	0.05	0.23	---	0.05	0.23
		GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Total HAP	0.09	0.41	0.11	0.49	---	0.11	0.49
		GRI-GLYCalc 4.0	CO2	14.60	63.95	17.52	76.74	---	17.52	76.74
		GRI-GLYCalc 4.0	CH4	3.12	13.65	3.74	16.38	---	3.74	16.38
		GRI-GLYCalc 4.0	N2O	---	---	---	---	---	---	---
		40CFR98 - Table A-1	CO2e	93	405	111	486	---	111	486
Unit ID	Description	Reference	Pollutant	Pre-Control - GLYCalc		Pre-Control x 120%		Control Eff	Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy	%	lb/hr	tpy
DSV-01/2E	Dehydrator 01 Regenerator/Still Vent (DSV-01/2E) 12.5 MMscfd 8,760 Hr/yr 0.52 MMscf/hr 4,563 MMscf/yr NESHAP HH - Exempt	---	NOX	---	---	---	---	---	---	---
		---	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	VOC	1.93	8.46	2.32	10.15	---	2.32	10.15
		---	SO2	---	---	---	---	---	---	---
		---	PM10/2.5	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Benzene	0.06	0.25	0.07	0.30	---	6.8E-02	0.30
		GRI-GLYCalc 4.0	Ethylbenzene	0.03	0.11	0.03	0.13	---	3.0E-02	1.3E-01
		---	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	0.01	0.04	0.01	0.05	---	1.1E-02	4.8E-02
		GRI-GLYCalc 4.0	Methanol	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Toluene	0.25	1.10	0.30	1.32	---	3.0E-01	1.32
		GRI-GLYCalc 4.0	2,2,4-TMP	4.6E-05	2.0E-04	5.5E-05	2.4E-04	---	5.5E-05	2.4E-04
		GRI-GLYCalc 4.0	Xylenes	1.30	5.70	1.56	6.84	---	1.56	6.84
		GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Total HAP	1.64	7.19	1.97	8.63	---	1.97	8.63
		GRI-GLYCalc 4.0	CO2	0.01	0.03	0.01	0.03	---	0.01	0.03
		GRI-GLYCalc 4.0	CH4	0.06	0.24	0.07	0.29	---	0.07	0.29
		GRI-GLYCalc 4.0	N2O	---	---	---	---	---	---	---
		40CFR98 - Table A-1	CO2e	1	6	2	7	---	1.7	7

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Dehydrator 01 (Combined) - 12.5 MMscfd

Unit ID	Description	Reference	Pollutant	Pre-Control - GLYCalc		Pre-Control x 120%		Control Eff	Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy	%	lb/hr	tpy
DEHY-01	Dehydrator 01	---	NOX	---	---	---	---	---	---	---
		---	CO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	VOC	2.96	12.94	3.55	15.53	0.0%	3.55	15.53
		---	SO2	---	---	---	---	---	---	---
		---	PM10/2.5	---	---	---	---	---	---	---
	(Combined - Flash Tank (DFT-01/1E) and Regenerator/Still Vent (DSV-01/2E))	GRI-GLYCalc 4.0	Benzene	0.06	0.27	0.07	0.33	0.0%	0.07	0.33
		GRI-GLYCalc 4.0	Ethylbenzene	0.03	0.11	0.03	0.14	0.0%	3.1E-02	1.4E-01
		---	HCHO	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	n-Hexane	0.03	0.14	0.04	0.17	0.0%	0.04	0.17
		GRI-GLYCalc 4.0	Methanol	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Toluene	0.27	1.18	0.32	1.42	0.0%	0.32	1.42
		GRI-GLYCalc 4.0	2,2,4-TMP	1.6E-04	7.0E-04	1.9E-04	8.4E-04	0.0%	1.9E-04	8.4E-04
		GRI-GLYCalc 4.0	Xylenes	1.34	5.89	1.61	7.07	0.0%	1.61	7.07
		GRI-GLYCalc 4.0	Other HAP	---	---	---	---	---	---	---
		GRI-GLYCalc 4.0	Total HAP	1.73	7.60	2.08	9.12	0.0%	2.08	9.12
		GRI-GLYCalc 4.0	CO2	14.61	63.98	17.53	76.77	---	17.53	76.77
		GRI-GLYCalc 4.0	CH4	3.17	13.90	3.81	16.68	0.0%	3.81	16.68
		GRI-GLYCalc 4.0	N2O	---	---	---	---	---	---	---
		40CFR98 - Table A-1	CO2e	94	411	113	494	0.0%	113	494
	12.5 MMscfd									
	8,760 Hr/yr									
	0.52 MMscf/hr									
	4,563 MMscf/yr									
	NESHAP HH - Exempt									

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

12.5 MMscfd Dehydrator 01	GRI-GLYCalc 4.0* Model Results		Worst-Case (W/ 120% Margin)		*Dehydrator Operating Parameters (See Attachments H - Extended Gas Analysis and N - GRI-GLYCalc Model results)			
NMNEHC = VOC	2.96 lb/hr	12.94 tpy	3.55 lb/hr	15.53 tpy	Dry Gas Flow Rate:	12.5 MMscfd	Extended Gas Analysis:	07/02/13
Benzene	0.06 lb/hr	0.27 tpy	0.07 lb/hr	0.33 tpy	Wet Gas Temperature:	58 oF	Flash Tank Temperature:	170 oF
Ethylbenzene	0.026 lb/hr	0.115 tpy	0.031 lb/hr	0.138 tpy	Wet Gas Pressure:	600 psig	Flash Tank Pressure:	38 psig
HCHO	---	---	---	---	Wet Gas Water Content:	Saturated	Flash Tank Off-Gas:	50% Recycle
n-Hexane	0.03 lb/hr	0.14 tpy	0.04 lb/hr	0.17 tpy	Dry Gas Water Content:	7.00 lb-H2O/MMscf	Stripping Gas:	na
Methanol	---	---	---	---	Lean Glycol Water Content:	1.50 wt% H2O	Stripping Gas Flow Rate:	na
Toluene	0.27 lb/hr	1.18 tpy	0.32 lb/hr	1.42 tpy	Glycol Pump Type:	Gas Injection	Condenser Temperature:	na
2,2,4-TMP	0.01 lb/hr	0.001 tpy	0.01 lb/hr	0.001 tpy	Glycol Pump Model:	Kimray 4020PV	Condenser Pressure:	na
Xylenes	1.34 lb/hr	5.89 tpy	1.61 lb/hr	7.07 tpy	Lean Glycol Circulation Rate:	0.67 gpm	Control Efficiency:	na
Other HAP	---	---	---	---	Note: The dehydrator emissions shown throughout the permit application reflect no control. Due to odor issues at the facility, it is likely a BTEX unit will be installed in the future to control dehydrator emissions.			
Total HAP	1.73 lb/hr	7.60 tpy	2.08 lb/hr	9.12 tpy				
CO2	14.61 lb/hr	63.98 tpy	17.53 lb/hr	76.77 tpy				
CH4	3.17 lb/hr	13.90 tpy	3.81 lb/hr	16.68 tpy				
CO2e	94 lb/hr	411 tpy	113 lb/hr	494 tpy				

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Reboiler 01 - 0.30 MMBtu/hr (RBV-01/3E)

Unit ID	Description	Reference	Pollutant	Emission Factor		Pre-Controlled		Control %	Controlled	
				lb/MMscf	lb/MMBtu	lb/hr	tpy		lb/hr	tpy
RBV-01/3E	Reboiler 01	EPA AP-42 Table 1.4-2	NOX	100.00	0.10	0.03	0.13	na	0.03	0.13
		EPA AP-42 Table 1.4-2	CO	84.00	0.08	0.02	0.11	na	0.02	0.11
		EPA AP-42 Table 1.4-2	VOC	5.68	0.01	1.7E-03	0.01	na	1.7E-03	0.01
		EPA AP-42 Table 1.4-2	SO2	0.60	5.88E-04	1.8E-04	7.7E-04	na	1.8E-04	7.7E-04
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.00	0.01	na	0.00	0.01
	0.30 MMBtu/hr (HHV)	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	6.2E-07	2.7E-06	na	6.2E-07	2.7E-06
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	2.2E-05	9.7E-05	na	2.2E-05	9.7E-05
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	5.3E-04	0.00	na	5.3E-04	2.3E-03
		EPA AP-42 Table 1.4-3	Methanol	---	---	---	---	---	---	---
	8,760 hr/yr	EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.33E-06	1.0E-06	4.4E-06	---	1.0E-06	4.4E-06
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	na	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Other HAP	1.9E-03	1.86E-06	5.6E-07	2.4E-06	na	5.6E-07	2.4E-06
		EPA AP-42 Table 1.4-3	Total HAP	1.88	1.85E-03	5.5E-04	0.00	na	5.5E-04	2.4E-03
	1,020 Btu/scf (HHV)	EPA AP-42 Table 1.4-2	CO2	120,000	118	35	155	na	35	155
		EPA AP-42 Table 1.4-2	CH4	2.30	2.25E-03	6.8E-04	0.00	na	6.8E-04	3.0E-03
		EPA AP-42 Table 1.4-2	N2O	2.20	2.16E-03	6.5E-04	0.00	na	6.5E-04	2.8E-03
		40CFR98 - Table A-1	CO2e	120,713	118	36	156	na	36	156
	294 scf/hr									
	7.06 Mscfd									
	2.58 MMscf/yr									

- Notes:
- 1 - The combustion emission factors are based on a default fuel heat content of 1,020 Btu/scf (HHV).
 - 2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.
 - 3 - Total HAP includes HCHO, n-hexane, BTEX (benzene, toluene, ethylbenzene, xylene), acetaldehyde, acrolein, and methanol.

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Storage Tank 01 - Produced Water (T-01/4E)

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		ProMax				CO2e	
							100.00 Wgt%	tpy	5.00 Wgt%	tpy	1.00 Wgt%	tpy	10.00 Wgt%	tpy	CO2	CH4			GWP = 25	
							lb/hr		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
T-01/4E	Prod H2O	210	12.0	2,520	0.039 lb/bbl	0.004 lb/hr	0.02	0.07	7.5E-04	3.3E-03	1.5E-04	6.6E-04	1.5E-03	0.01	0.04	0.19	0.01	0.06	0.37	2
TOTAL VOLUME:		210	12.0	2,520																
TOTAL EMISSIONS:							0.02	0.07	7.5E-04	3.3E-03	1.5E-04	6.6E-04	1.5E-03	0.01	0.04	0.19	0.01	0.06	0.37	2

- Notes:
- 1 - EPA-450/3-85-001a – "Volatile Organic Compound Emissions from Petroleum Refinery Wastewater Systems - Background Information for Proposed Standards" is a reasonable protocol for estimating potential water/oil storage tank working and breathing losses. EPA-450/3-85-001a, page 3-39, gives a VOC emission factor of 420 kg/MMgal wastewater produced in an oil-water separator. (0.420 g/gal * 0.0022 lb/g * 42 gal/bbl = 0.03889 lb/bbl)
 - 2 - These emission estimates are nearly 4X more conservative than emission factors required by the TCEQ on the Barnett Shale produced water tanks at gas-only sites.

**Table 1. Produced Water Storage Tank Flash Loss Emissions Factors for Barnett Shale
Special Inventory Purposes ONLY**

Pollutant	Average Produced Water Emission Factor (lb/bbl)	
	Gas Production Only Sites	Liquid Hydrocarbon and Gas Production Sites
VOC	0.01	0.0402
Benzene	0.0001	0.000054
Toluene	0.0003	0.000130
Ethylbenzene	0.000006	0.000003
Xylene(s)	0.00006	0.000049
n-Hexane	NA	0.000987

- 3 - Total HAP is estimated at 10.0% 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 - The total storage tank capacity at the facility is:

210

 bbl =

8,820

 gal.
- 6 - It is estimated that each tank will be emptied up to:

12

 t-o/yr =

2,520

 bbl/yr

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Attachment N - Supporting Emissions Calculations

Truck Load-Out - Produced Water (TLO/5E)

Unit ID	Description	S sat. fac.	P psia	M lb/lb-mol	T °R	CE %	L _L lb/Mgal	T-Put Mgal/yr	VOC AP-42 Sect 5.2 tpy	n-Hexane, BTEX, and 2,2,4-TMP (Ea) 2.00% of VOC tpy	Total HAP 12.00% of VOC tpy
TLO/5E	Truck Load-Out - Produced Water	1.45	1.5	30.0	510	0.0%	1.59	106	0.08	1.7E-03	0.01
TOTAL:									0.08	1.7E-03	0.01
									lb/yr: 169		

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

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

where:

L_L = loading loss, lb/1000 gal of liquid loaded

S = saturation factor, use 1.45 for splash loading

P = true vapor pressure of liquid loaded, psia.

(Conservative estimate - Measured RVP (100 °F) ranges from 1.0 to 1.3 psia;
so the actual TVP is expected to be less than 1.5 psia at common storage temperature.)

M = molecular weight of vapors, lb/lb-mol (Conservative estimate.)

T = temperature of bulk liquid loaded, °R = °F + 460 (Conservatively assumed 50 °F.)

CE = overall emission reduction efficiency (collection efficiency x control efficiency)

2 - Molecular weight and vapor pressure are based on operator experience and sampling data at various locations in the Marcellus Shale basin.

3 - The total storage tank capacity at the facility is:

210	bbl	=	8,820	gal.
12	t-o/yr	=	2,520	bbl/yr

4 - It is estimated that each tank will be emptied up to:

5 - n-Hexane, each BTEX, and 2,2,4-TMP components are estimated at 2% of VOC emissions and Total HAP is estimated at 12% of VOC emissions. □

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Piping and Equipment Fugitives - Gas (FUG/1F)

Unit ID	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC)		VOC 11.89 Wgt%		n-Hexane 0.13 Wgt%		BTEX, TMP-ea 0.01 Wgt%		Total HAP 0.16 Wgt%		CO2 0.39 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	Process Piping Fugitives (Gas)	Valves	257	0.00992	0%	2.55	11.17	0.30	1.33	3.3E-03	0.01	1.8E-04	7.9E-04	4.2E-03	0.02	0.01	0.04	1.91	8.38	48	209	
		Pump Seals	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Other	30	0.01940	0%	0.58	2.55	0.07	0.30	7.5E-04	3.3E-03	4.1E-05	1.8E-04	9.6E-04	4.2E-03	2.2E-03	0.01	0.44	1.91	11	48	
		Connectors	737	0.00044	0%	0.32	1.42	0.04	0.17	4.2E-04	1.8E-03	2.3E-05	1.0E-04	5.4E-04	2.3E-03	1.3E-03	0.01	0.24	1.07	6	27	
		Flanges	120	0.00086	0%	0.10	0.45	0.01	0.05	1.3E-04	5.8E-04	7.3E-06	3.2E-05	1.7E-04	7.4E-04	4.0E-04	1.7E-03	0.08	0.34	2	8	
		Open-ended	14	0.00441	0%	0.06	0.27	0.01	0.03	8.0E-05	3.5E-04	4.4E-06	1.9E-05	1.0E-04	4.5E-04	2.4E-04	1.0E-03	0.05	0.20	1	5	
			1,158	Subtotal:		3.62	15.86	0.43	1.89	0.00	0.02	2.6E-04	1.1E-03	0.01	0.03	0.01	0.06	2.72	11.90	68	297	

Unit ID	Description	Component (Unit) Type (Water/Oil)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Hydrocarbons (THC)		VOC 100.00 Wgt%		n-Hexane 5.00 Wgt%		BTEX, TMP-ea 1.00 Wgt%		Total HAP 10.00 Wgt%		CO2 --- Wgt%		CH4 --- 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	Process Piping Fugitives (Water/Oil)	Valves	129	0.00022	0%	0.03	0.12	0.03	0.12	1.4E-03	0.01	2.8E-04	0.00	0.00	0.01	---	---	---	---	---	---
		Pump Seals	6	0.00005	0%	3.2E-04	1.4E-03	3.2E-04	1.4E-03	1.6E-05	7.0E-05	3.2E-06	1.4E-05	3.2E-05	1.4E-04	---	---	---	---	---	---
		Other	15	0.03086	0%	0.46	2.03	0.46	2.03	0.02	0.10	0.00	0.02	0.05	0.20	---	---	---	---	---	---
		Connectors	369	0.00024	0%	0.09	0.39	0.09	0.39	0.00	0.02	8.9E-04	0.00	0.01	0.04	---	---	---	---	---	---
		Flanges	60	0.00001	0%	3.8E-04	1.7E-03	3.8E-04	1.7E-03	1.9E-05	8.4E-05	3.8E-06	1.7E-05	3.8E-05	1.7E-04	---	---	---	---	---	---
		Open-ended	7	0.00055	0%	0.00	0.02	0.00	0.02	1.9E-04	8.4E-04	3.9E-05	1.7E-04	3.9E-04	0.00	---	---	---	---	---	---
			585	Subtotal:		0.58	2.56	0.58	2.56	0.03	0.13	0.01	0.03	0.06	0.26	---	---	---	---	---	---

TOTAL FUGITIVE (FUG/1F) EMISSIONS: **4.21 18.42 1.02 4.45 0.03 0.15 0.01 0.03 0.06 0.28 0.01 0.06 2.72 11.90 68 297**

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

3 - Components in Gas Service are based on GRI-HAPCalc estimates, plus a 0% margin
 4 - Components in Water/Oil Service are based on Gas Component count, times a 50% reduction
 5 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.
 6 - To be conservative, the following gas and water/oil characteristics were assumed:

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

*These high "Others" emission factors are suspect and likely an error in the EPA Protocol.

Pollutant	Gas		Water/Oil	
	Analysis	Estimated	Analysis	Estimated
Carbon Dioxide	0.32 Wgt%	0.39 Wgt%	---	---
Methane	71.87 Wgt%	75.00 Wgt%	---	---
VOC	9.91 Wgt%	11.89 Wgt%	---	100.00 Wgt%
n-Hexane	0.11 Wgt%	0.13 Wgt%	---	5.00 Wgt%
BTEX, TMP-ea	0.01 Wgt%	0.01 Wgt%	---	1.00 Wgt%
Total HAP	0.14 Wgt%	0.16 Wgt%	---	10.00 Wgt%

Potentially Applicable
AP-42 and GHG EMISSION FACTORS
(Preferentially use test data or vendor data where available)

Pollutant		GAS-FIRED ENGINE			GAS-FIRED TURBINE		
		AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			AP-42 Table 3.1-1; 3.1-2a; 3.1-3 04/00		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix# lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	3.170E+00	4.080E+00	2.210E+00	3.200E-01	1.300E-01	9.900E-02
	CO (≥ 90% Load)	3.860E-01	3.170E-01	3.720E+00	8.200E-02	3.000E-02	1.500E-02
	THC (TOC)	1.640E+00	1.470E+00	3.580E-01	1.100E-02	1.100E-02	1.100E-02
	NMHC (THC-CH4)	1.900E-01	2.200E-01	1.280E-01	2.400E-03	2.400E-03	2.400E-03
	NMNEHC (NMHC-C2H6)	1.191E-01	1.150E-01	5.760E-02	2.100E-03	2.100E-03	2.100E-03
	VOC	1.200E-01	1.180E-01	2.960E-02	2.100E-03	2.100E-03	2.100E-03
	SO2*** (2,000 gr-S/MMscf)	5.880E-04	5.880E-04	5.880E-04	3.400E-03	3.400E-03	3.400E-03
	PM10/2.5 (Filter+Cond)	4.831E-02	9.987E-03	1.941E-02	6.600E-03	6.600E-03	6.600E-03
HAPs	Benzene	1.940E-03	4.400E-04	1.580E-03	1.200E-05	1.200E-05	9.100E-07
	Ethylbenzene	1.080E-04	3.970E-05	2.480E-05	3.200E-05	3.200E-05	3.200E-05
	Formaldehyde (HCHO)	5.520E-02	5.280E-02	2.050E-02	7.100E-04	7.100E-04	2.000E-05
	n-Hexane	4.450E-04	1.110E-03	---	---	---	---
	Methanol (MeOH)	2.480E-03	2.500E-03	3.060E-03	---	---	---
	Toluene	9.630E-04	4.080E-04	5.580E-04	1.300E-04	1.300E-04	1.300E-04
	TMP, 2,2,4- (i-Octane)	8.460E-04	2.500E-04	---	---	---	---
	Xylenes	2.680E-04	1.840E-04	1.950E-04	6.400E-05	6.400E-05	6.400E-05
GHG	Other HAPs	1.715E-02	1.443E-02	6.359E-03	1.061E-04	1.061E-04	1.061E-04
	CO2**** (GWP=1)	1.170E+02	1.170E+02	1.170E+02	1.170E+02	1.170E+02	1.170E+02
	CH4 (GWP=25)	1.450E+00	1.250E+00	2.300E-01	8.600E-03	8.600E-03	8.600E-03
	N2O (GWP=298)	2.205E-04	2.205E-04	2.205E-04	3.000E-03	3.000E-03	3.000E-03
		1.533E+02	1.483E+02	1.228E+02	1.181E+02	1.181E+02	1.181E+02

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

Pollutant		GAS-FIRED EXTERNAL COMBUSTION			FLARE	DIESEL ENGINE
		AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			13.5-1 04/15	3.3-1; 3.3-2 10/96
		Uncontrolled lb/MMBtu	LoNOx Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	Combustion lb/MMBtu	Uncontrolled lb/MMBtu
CRITERIA	NOX	9.804E-02	4.902E-02	3.137E-02	6.800E-02	4.410E+00
	CO	8.235E-02	8.235E-02	8.235E-02	3.100E-01	9.500E-01
	THC (TOC)	1.078E-02	1.078E-02	1.078E-02	≥98%	3.600E-01
	NMHC (THC-CH4)	8.529E-03	8.529E-03	8.529E-03	Destruction and Removal Efficiency	3.534E-01
	NMNEHC (NMHC-C2H6)	5.490E-03	5.490E-03	5.490E-03		3.503E-01
	VOC (NMNEHC+HCHO)	5.564E-03	5.564E-03	5.564E-03		3.600E-01
	SO2 (2,000 gr-S/MMscf)	5.882E-04	5.882E-04	5.882E-04	5.882E-04	2.900E-01
	PM10/2.5 (Filter+Condense)	7.451E-03	7.451E-03	7.451E-03	7.451E-03	3.100E-01
HAPs	Benzene	2.059E-06	2.059E-06	2.059E-06	≥98% Destruction and Removal Efficiency	9.330E-04
	Ethylbenzene	---	---	---		---
	HCHO (Formaldehyde)	7.353E-05	7.353E-05	7.353E-05		1.180E-03
	n-Hexane	1.765E-03	1.765E-03	1.765E-03		---
	Methanol (MeOH)	---	---	---		---
	Toluene	3.333E-06	3.333E-06	3.333E-06		4.090E-04
	2,2,4-TMP (i-Octane)	---	---	---		---
	Xylenes	---	---	---		2.850E-04
GHG	Other HAPs	1.861E-06	1.861E-06	1.861E-06		1.050E-03
	CO2 (GWP=1)	1.176E+02	1.176E+02	1.176E+02	1.176E+02	1.640E+02
	CH4 (GWP=25)	2.255E-03	2.255E-03	2.255E-03	98% DRE	6.614E-03
	N2O (GWP=298)	2.157E-03	6.275E-04	6.275E-04	2.157E-03	1.323E-03
	CO2e	1.183E+02	1.179E+02	1.179E+02	1.183E+02	1.646E+02

40 CFR 98 - DEFAULT EMISSION FACTORS				
Fuel Type	Table C-1 to Subpart C of Part 98		Table C-2 to Subpart C of Part 98	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	163.054	6.614E-03	1.323E-03
Propane	0.091 MMBtu/gal	138.605	6.614E-03	1.323E-03
Natural Gas	1,026 Btu/scf	116.977	2.205E-03	2.205E-04

Global Warming Potential (100 Yr) (GWP)		
Table A-1 to Subpart A of Part 98		
CO2	CH4*	N2O#
1.00	25.00	298.00

#Revised by EPA on 11/29/13

Conversion Factors

<http://www.onlineconversion.com/>

1.0 lb	=	453.592 g
1.0 kg	=	2.205 lb
1.0 hp	=	2,544.433 Btu/hr
1.0 hp	=	745.700 Watt
1.0 kW	=	3,412.142 Btu/hr
1.0 kW-hr	=	1.340 hp-hr
1.0 cf	=	7.481 gal
1.0 gal H2O	=	8.338 lb
1.0 cf H2O	=	62.371 gal
1.0 m	=	3.281 ft
1.0 km	=	0.621 mi
1.0 acre	=	43,560.174 ft2
1.0 °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 SOX (2,000 gr/MMscf).

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

GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: 00 - Dewhurst - NSR-Mod - 12.5 MMscfd Dehydrator

File Name: C:\projects2\wfs\OVM\Dewhurst\R13 Application\08 - Dewhurst - NSR-Mod - GLYCalc 58oF 600psig - 170oF 38 psig - Dewhurst - 50% - 1.5 gpm.ddf

Date: July 16, 2015

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0553	1.328	0.2424
Ethane	0.0521	1.250	0.2281
Propane	0.0471	1.130	0.2061
Isobutane	0.0140	0.335	0.0611
n-Butane	0.0294	0.707	0.1290
Isopentane	0.0114	0.273	0.0498
n-Pentane	0.0109	0.262	0.0478
Cyclopentane	0.0001	0.003	0.0005
n-Hexane	0.0091	0.218	0.0398
Cyclohexane	0.0267	0.642	0.1171
Other Hexanes	0.0138	0.330	0.0603
Heptanes	0.0531	1.274	0.2326
Methylcyclohexane	0.0334	0.802	0.1464
2,2,4-Trimethylpentane	<0.0001	0.001	0.0002
Benzene	0.0564	1.353	0.2470
Toluene	0.2510	6.024	1.0994
Ethylbenzene	0.0250	0.601	0.1096
Xylenes	1.3005	31.213	5.6963
C8+ Heavies	0.0490	1.175	0.2145
Total Emissions	2.0384	48.921	8.9281
Total Hydrocarbon Emissions	2.0384	48.921	8.9281
Total VOC Emissions	1.9310	46.343	8.4576
Total HAP Emissions	1.6421	39.410	7.1924
Total BTEX Emissions	1.6330	39.191	7.1523

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.1173	74.815	13.6538
Ethane	0.9631	23.115	4.2184
Propane	0.4153	9.966	1.8189
Isobutane	0.0895	2.149	0.3922
n-Butane	0.1506	3.614	0.6595
Isopentane	0.0556	1.334	0.2435
n-Pentane	0.0441	1.058	0.1931
Cyclopentane	0.0001	0.003	0.0006
n-Hexane	0.0223	0.536	0.0979
Cyclohexane	0.0176	0.422	0.0769
Other Hexanes	0.0442	1.061	0.1936
Heptanes	0.0707	1.696	0.3095
Methylcyclohexane	0.0184	0.441	0.0804
2,2,4-Trimethylpentane	0.0001	0.003	0.0005
Benzene	0.0060	0.144	0.0262
Toluene	0.0189	0.454	0.0829
Ethylbenzene	0.0012	0.029	0.0052
Xylenes	0.0440	1.055	0.1926

C8+ Heavies	0.0259	0.621	0.1134
Total Emissions	5.1048	122.516	22.3591
Total Hydrocarbon Emissions	5.1048	122.516	22.3591
Total VOC Emissions	1.0244	24.586	4.4869
Total HAP Emissions	0.0925	2.221	0.4054
Total BTEX Emissions	0.0701	1.682	0.3070

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	6.2346	149.630	27.3075
Ethane	1.9262	46.229	8.4369
Propane	0.8305	19.933	3.6377
Isobutane	0.1791	4.298	0.7843
n-Butane	0.3011	7.227	1.3189
Isopentane	0.1112	2.668	0.4869
n-Pentane	0.0882	2.117	0.3863
Cyclopentane	0.0003	0.006	0.0011
n-Hexane	0.0447	1.073	0.1957
Cyclohexane	0.0351	0.843	0.1539
Other Hexanes	0.0884	2.122	0.3873
Heptanes	0.1413	3.391	0.6189
Methylcyclohexane	0.0367	0.882	0.1609
2,2,4-Trimethylpentane	0.0002	0.005	0.0010
Benzene	0.0120	0.287	0.0524
Toluene	0.0379	0.909	0.1659
Ethylbenzene	0.0024	0.057	0.0104
Xylenes	0.0880	2.111	0.3852
C8+ Heavies	0.0518	1.243	0.2268
Total Emissions	10.2096	245.031	44.7182
Total Hydrocarbon Emissions	10.2096	245.031	44.7182
Total VOC Emissions	2.0488	49.172	8.9738
Total HAP Emissions	0.1851	4.442	0.8107
Total BTEX Emissions	0.1402	3.364	0.6140

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.1726	76.144	13.8962
Ethane	1.0152	24.365	4.4466
Propane	0.4623	11.096	2.0250
Isobutane	0.1035	2.484	0.4533
n-Butane	0.1800	4.320	0.7885
Isopentane	0.0669	1.607	0.2932
n-Pentane	0.0550	1.320	0.2409
Cyclopentane	0.0003	0.006	0.0011
n-Hexane	0.0314	0.755	0.1377
Cyclohexane	0.0443	1.063	0.1940
Other Hexanes	0.0580	1.391	0.2539
Heptanes	0.1238	2.970	0.5420
Methylcyclohexane	0.0518	1.243	0.2269
2,2,4-Trimethylpentane	0.0002	0.004	0.0007
Benzene	0.0624	1.497	0.2732
Toluene	0.2699	6.479	1.1823

Ethylbenzene	0.0262	0.629	0.1148
Xylenes	1.3445	32.268	5.8890
C8+ Heavies	0.0749	1.797	0.3279

Total Emissions	7.1432	171.437	31.2872
Total Hydrocarbon Emissions	7.1432	171.437	31.2872
Total VOC Emissions	2.9554	70.929	12.9445
Total HAP Emissions	1.7346	41.631	7.5977
Total BTEX Emissions	1.7030	40.873	7.4593

GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: 00 - Dewhurst - NSR-Mod - 12.5 MMscfd Dehydrator

File Name: C:\projects2\wfs\OVM\Dewhurst\R13 Application\08 - Dewhurst - NSR-Mod -
GLYCalc 58oF 600psig - 170oF 38 psig - Dewhurst - 50% - 1.5 gpm.ddf

Date: July 16, 2015

DESCRIPTION:

Description: Wet Gas: 58 oF, 600 psig
 Pump: Gas Injection, 0.67 gpm
 Flash Tank: 170 oF, 38 psig
 50% Recycle of Flash Tank Offgas

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 58.00 deg. F
 Pressure: 600.00 psig
 Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.1381
Nitrogen	0.3574
Methane	84.8558
Ethane	10.9436
Propane	2.5387
Isobutane	0.3342
n-Butane	0.4665
Isopentane	0.1305
n-Pentane	0.0854
Cyclopentane	0.0001
n-Hexane	0.0237
Cyclohexane	0.0071
Other Hexanes	0.0584
Heptanes	0.0384
Methylcyclohexane	0.0057
2,2,4-Trimethylpentane	0.0001
Benzene	0.0008
Toluene	0.0018
Ethylbenzene	0.0001
Xylenes	0.0036
C8+ Heavies	0.0073

DRY GAS:

Flow Rate: 12.5 MMSCF/day
 Water Content: 7.0 lbs. H2O/MMSCF

LEAN GLYCOL:

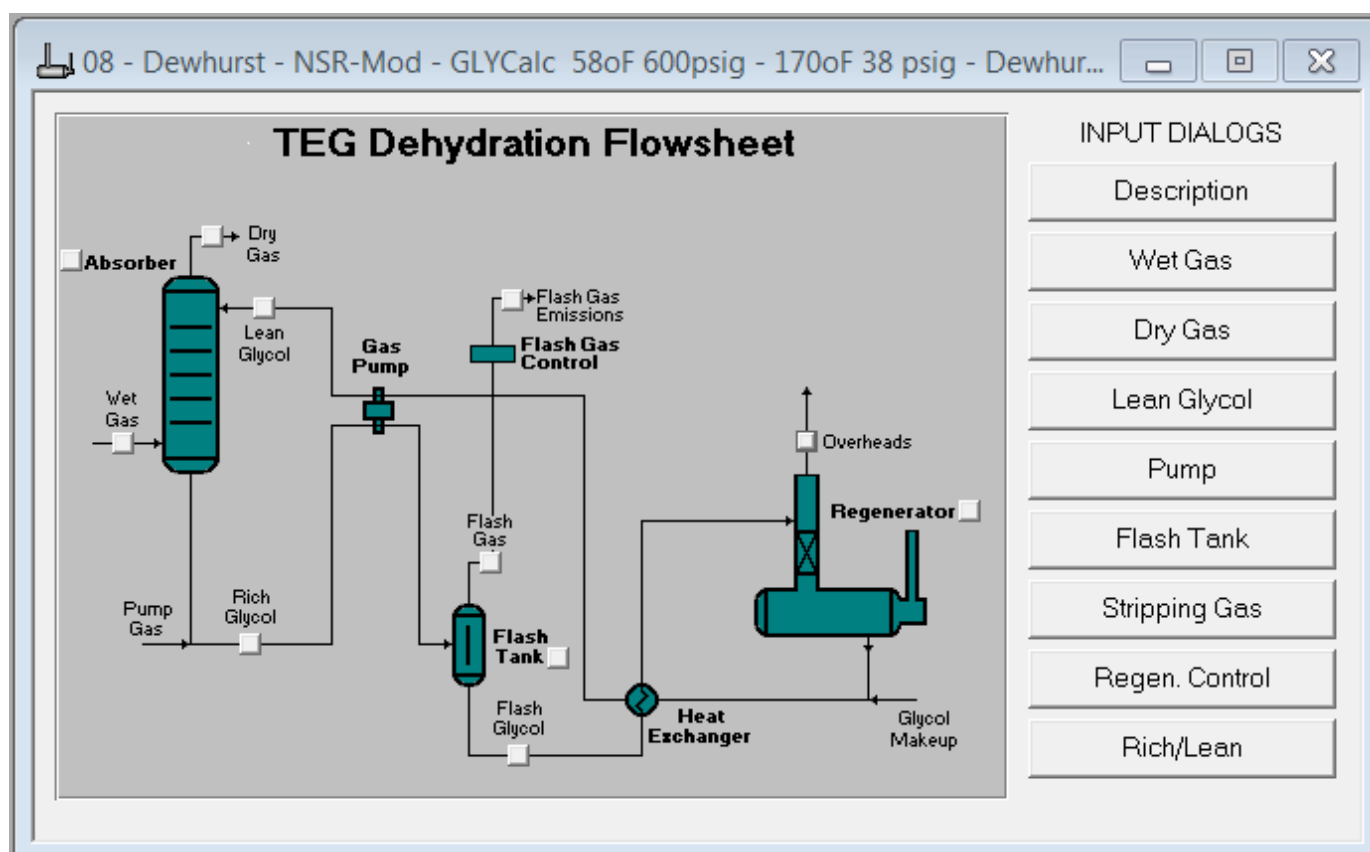
Glycol Type: TEG
 Water Content: 1.5 wt% H2O
 Flow Rate: 0.7 gpm

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: 170.0 deg. F
 Pressure: 38.0 psig



GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: 00 - Dewhurst - NSR-Mod - 12.5 MMscfd Dehydrator

File Name: C:\projects2\wfs\OVM\Dewhurst\R13 Application\08 - Dewhurst - NSR-Mod - GLYCalc 58oF 600psig - 170oF 38 psig - Dewhurst - 50% - 1.5 gpm.ddf

Date: July 16, 2015

DESCRIPTION:

Description: Wet Gas: 58 oF, 600 psig
 Pump: Gas Injection, 0.67 gpm
 Flash Tank: 170 oF, 38 psig
 50% Recycle of Flash Tank Offgas

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0553	1.328	0.2424
Ethane	0.0521	1.250	0.2281
Propane	0.0471	1.130	0.2061
Isobutane	0.0140	0.335	0.0611
n-Butane	0.0294	0.707	0.1290
Isopentane	0.0114	0.273	0.0498
n-Pentane	0.0109	0.262	0.0478
Cyclopentane	0.0001	0.003	0.0005
n-Hexane	0.0091	0.218	0.0398
Cyclohexane	0.0267	0.642	0.1171
Other Hexanes	0.0138	0.330	0.0603
Heptanes	0.0531	1.274	0.2326
Methylcyclohexane	0.0334	0.802	0.1464
2,2,4-Trimethylpentane	<0.0001	0.001	0.0002
Benzene	0.0564	1.353	0.2470
Toluene	0.2510	6.024	1.0994
Ethylbenzene	0.0250	0.601	0.1096
Xylenes	1.3005	31.213	5.6963
C8+ Heavies	0.0490	1.175	0.2145
Total Emissions	2.0384	48.921	8.9281
Total Hydrocarbon Emissions	2.0384	48.921	8.9281
Total VOC Emissions	1.9310	46.343	8.4576
Total HAP Emissions	1.6421	39.410	7.1924
Total BTEX Emissions	1.6330	39.191	7.1523

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.1173	74.815	13.6538
Ethane	0.9631	23.115	4.2184
Propane	0.4153	9.966	1.8189
Isobutane	0.0895	2.149	0.3922
n-Butane	0.1506	3.614	0.6595

Isopentane	0.0556	1.334	0.2435
n-Pentane	0.0441	1.058	0.1931
Cyclopentane	0.0001	0.003	0.0006
n-Hexane	0.0223	0.536	0.0979
Cyclohexane	0.0176	0.422	0.0769
Other Hexanes	0.0442	1.061	0.1936
Heptanes	0.0707	1.696	0.3095
Methylcyclohexane	0.0184	0.441	0.0804
2,2,4-Trimethylpentane	0.0001	0.003	0.0005
Benzene	0.0060	0.144	0.0262
Toluene	0.0189	0.454	0.0829
Ethylbenzene	0.0012	0.029	0.0052
Xylenes	0.0440	1.055	0.1926
C8+ Heavies	0.0259	0.621	0.1134
<hr/>			
Total Emissions	5.1048	122.516	22.3591
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Total Hydrocarbon Emissions	5.1048	122.516	22.3591
Total VOC Emissions	1.0244	24.586	4.4869
Total HAP Emissions	0.0925	2.221	0.4054
Total BTEX Emissions	0.0701	1.682	0.3070

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	6.2346	149.630	27.3075
Ethane	1.9262	46.229	8.4369
Propane	0.8305	19.933	3.6377
Isobutane	0.1791	4.298	0.7843
n-Butane	0.3011	7.227	1.3189
Isopentane	0.1112	2.668	0.4869
n-Pentane	0.0882	2.117	0.3863
Cyclopentane	0.0003	0.006	0.0011
n-Hexane	0.0447	1.073	0.1957
Cyclohexane	0.0351	0.843	0.1539
Other Hexanes	0.0884	2.122	0.3873
Heptanes	0.1413	3.391	0.6189
Methylcyclohexane	0.0367	0.882	0.1609
2,2,4-Trimethylpentane	0.0002	0.005	0.0010
Benzene	0.0120	0.287	0.0524
Toluene	0.0379	0.909	0.1659
Ethylbenzene	0.0024	0.057	0.0104
Xylenes	0.0880	2.111	0.3852
C8+ Heavies	0.0518	1.243	0.2268
<hr/>			
Total Emissions	10.2096	245.031	44.7182
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Total Hydrocarbon Emissions	10.2096	245.031	44.7182
Total VOC Emissions	2.0488	49.172	8.9738
Total HAP Emissions	0.1851	4.442	0.8107
Total BTEX Emissions	0.1402	3.364	0.6140

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.1726	76.144	13.8962
Ethane	1.0152	24.365	4.4466
Propane	0.4623	11.096	2.0250
Isobutane	0.1035	2.484	0.4533

n-Butane	0.1800	4.320	0.7885
Isopentane	0.0669	1.607	0.2932
n-Pentane	0.0550	1.320	0.2409
Cyclopentane	0.0003	0.006	0.0011
n-Hexane	0.0314	0.755	0.1377
Cyclohexane	0.0443	1.063	0.1940
Other Hexanes	0.0580	1.391	0.2539
Heptanes	0.1238	2.970	0.5420
Methylcyclohexane	0.0518	1.243	0.2269
2,2,4-Trimethylpentane	0.0002	0.004	0.0007
Benzene	0.0624	1.497	0.2732
Toluene	0.2699	6.479	1.1823
Ethylbenzene	0.0262	0.629	0.1148
Xylenes	1.3445	32.268	5.8890
C8+ Heavies	0.0749	1.797	0.3279

Total Emissions	7.1432	171.437	31.2872
Total Hydrocarbon Emissions	7.1432	171.437	31.2872
Total VOC Emissions	2.9554	70.929	12.9445
Total HAP Emissions	1.7346	41.631	7.5977
Total BTEX Emissions	1.7030	40.873	7.4593

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction

Methane	27.5500	13.8962	49.56
Ethane	8.6650	4.4466	48.68
Propane	3.8439	2.0250	47.32
Isobutane	0.8454	0.4533	46.39
n-Butane	1.4479	0.7885	45.55
Isopentane	0.5367	0.2932	45.36
n-Pentane	0.4341	0.2409	44.50
Cyclopentane	0.0017	0.0011	33.89
n-Hexane	0.2356	0.1377	41.54
Cyclohexane	0.2709	0.1940	28.39
Other Hexanes	0.4475	0.2539	43.27
Heptanes	0.8515	0.5420	36.34
Methylcyclohexane	0.3073	0.2269	26.18
2,2,4-Trimethylpentane	0.0011	0.0007	41.93
Benzene	0.2994	0.2732	8.76
Toluene	1.2653	1.1823	6.55
Ethylbenzene	0.1200	0.1148	4.35
Xylenes	6.0816	5.8890	3.17
C8+ Heavies	0.4413	0.3279	25.70

Total Emissions	53.6464	31.2872	41.68
Total Hydrocarbon Emissions	53.6464	31.2872	41.68
Total VOC Emissions	17.4314	12.9445	25.74
Total HAP Emissions	8.0031	7.5977	5.06
Total BTEX Emissions	7.7663	7.4593	3.95

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: 1.32 lbs. H2O/MMSCF
 Temperature: 58.0 deg. F
 Pressure: 600.0 psig
 Dry Gas Flow Rate: 12.5000 MMSCF/day
 Glycol Losses with Dry Gas: 0.0121 lb/hr
 Wet Gas Water Content: Saturated
 Calculated Wet Gas Water Content: 22.64 lbs. H2O/MMSCF
 Calculated Lean Glycol Recirc. Ratio: 3.62 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	5.83%	94.17%
Carbon Dioxide	99.93%	0.07%
Nitrogen	100.00%	0.00%
Methane	100.00%	0.00%
Ethane	99.99%	0.01%
Propane	99.97%	0.03%
Isobutane	99.96%	0.04%
n-Butane	99.94%	0.06%
Isopentane	99.94%	0.06%
n-Pentane	99.91%	0.09%
Cyclopentane	99.63%	0.37%
n-Hexane	99.84%	0.16%
Cyclohexane	99.28%	0.72%
Other Hexanes	99.88%	0.12%
Heptanes	99.66%	0.34%
Methylcyclohexane	99.12%	0.88%
2,2,4-Trimethylpentane	99.86%	0.14%
Benzene	92.06%	7.94%
Toluene	87.34%	12.66%
Ethylbenzene	81.22%	18.78%
Xylenes	73.56%	26.44%
C8+ Heavies	99.44%	0.56%

FLASH TANK

Flash Control: Combustion device
 Flash Control Efficiency: 50.00 %
 Flash Temperature: 170.0 deg. F
 Flash Pressure: 38.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.33%	0.67%
Carbon Dioxide	7.39%	92.61%
Nitrogen	0.85%	99.15%
Methane	0.88%	99.12%
Ethane	2.63%	97.37%

Propane	5.36%	94.64%
Isobutane	7.23%	92.77%
n-Butane	8.91%	91.09%
Isopentane	9.58%	90.42%
n-Pentane	11.34%	88.66%
Cyclopentane	32.54%	67.46%
n-Hexane	17.26%	82.74%
Cyclohexane	44.96%	55.04%
Other Hexanes	14.16%	85.84%
Heptanes	27.65%	72.35%
Methylcyclohexane	49.68%	50.32%
2,2,4-Trimethylpentane	17.17%	82.83%
Benzene	83.36%	16.64%
Toluene	87.92%	12.08%
Ethylbenzene	92.21%	7.79%
Xylenes	94.48%	5.52%
C8+ Heavies	54.53%	45.47%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	33.94%	66.06%
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	3.58%	96.42%
n-Pentane	3.29%	96.71%
Cyclopentane	1.42%	98.58%
n-Hexane	2.45%	97.55%
Cyclohexane	6.84%	93.16%
Other Hexanes	5.64%	94.36%
Heptanes	1.66%	98.34%
Methylcyclohexane	7.80%	92.20%
2,2,4-Trimethylpentane	7.19%	92.81%
Benzene	5.98%	94.02%
Toluene	8.97%	91.03%
Ethylbenzene	11.28%	88.72%
Xylenes	13.68%	86.32%
C8+ Heavies	21.12%	78.88%

STREAM REPORTS:

WET GAS STREAM

Temperature: 58.00 deg. F

Pressure: 614.70 psia
 Flow Rate: 5.21e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	4.77e-002	1.18e+001
Carbon Dioxide	1.38e-001	8.34e+001
Nitrogen	3.57e-001	1.37e+002
Methane	8.48e+001	1.87e+004
Ethane	1.09e+001	4.52e+003
Propane	2.54e+000	1.54e+003
Isobutane	3.34e-001	2.67e+002
n-Butane	4.66e-001	3.72e+002
Isopentane	1.30e-001	1.29e+002
n-Pentane	8.54e-002	8.46e+001
Cyclopentane	1.00e-004	9.63e-002
n-Hexane	2.37e-002	2.80e+001
Cyclohexane	7.10e-003	8.20e+000
Other Hexanes	5.84e-002	6.91e+001
Heptanes	3.84e-002	5.28e+001
Methylcyclohexane	5.70e-003	7.68e+000
2,2,4-Trimethylpentane	1.00e-004	1.57e-001
Benzene	8.00e-004	8.58e-001
Toluene	1.80e-003	2.28e+000
Ethylbenzene	1.00e-004	1.46e-001
Xylenes	3.60e-003	5.25e+000
C8+ Heavies	7.30e-003	1.71e+001
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Total Components	100.00	2.60e+004

DRY GAS STREAM

Temperature: 58.00 deg. F
 Pressure: 614.70 psia
 Flow Rate: 5.21e+005 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	2.78e-003	6.88e-001
Carbon Dioxide	1.38e-001	8.34e+001
Nitrogen	3.57e-001	1.37e+002
Methane	8.49e+001	1.87e+004
Ethane	1.09e+001	4.52e+003
Propane	2.54e+000	1.54e+003
Isobutane	3.34e-001	2.67e+002
n-Butane	4.66e-001	3.72e+002
Isopentane	1.30e-001	1.29e+002
n-Pentane	8.53e-002	8.45e+001
Cyclopentane	9.96e-005	9.59e-002
n-Hexane	2.37e-002	2.80e+001
Cyclohexane	7.05e-003	8.14e+000
Other Hexanes	5.83e-002	6.90e+001
Heptanes	3.83e-002	5.26e+001
Methylcyclohexane	5.65e-003	7.62e+000
2,2,4-Trimethylpentane	9.99e-005	1.57e-001
Benzene	7.37e-004	7.90e-001
Toluene	1.57e-003	1.99e+000
Ethylbenzene	8.12e-005	1.18e-001

Xylenes	2.65e-003	3.86e+000
C8+ Heavies	7.26e-003	1.70e+001

Total Components	100.00	2.60e+004

LEAN GLYCOL STREAM

Temperature: 58.00 deg. F
Flow Rate: 6.69e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
-----	-----	-----
TEG	9.84e+001	3.71e+002
Water	1.50e+000	5.65e+000
Carbon Dioxide	1.57e-012	5.91e-012
Nitrogen	1.48e-013	5.59e-013
Methane	6.21e-018	2.34e-017
Ethane	7.84e-008	2.95e-007
Propane	4.51e-009	1.70e-008
Isobutane	9.01e-010	3.40e-009
n-Butane	1.44e-009	5.43e-009
Isopentane	1.12e-004	4.21e-004
n-Pentane	9.84e-005	3.71e-004
Cyclopentane	4.76e-007	1.79e-006
n-Hexane	6.05e-005	2.28e-004
Cyclohexane	5.21e-004	1.96e-003
Other Hexanes	2.18e-004	8.23e-004
Heptanes	2.38e-004	8.98e-004
Methylcyclohexane	7.50e-004	2.83e-003
2,2,4-Trimethylpentane	8.70e-007	3.28e-006
Benzene	9.51e-004	3.59e-003
Toluene	6.57e-003	2.47e-002
Ethylbenzene	8.44e-004	3.18e-003
Xylenes	5.47e-002	2.06e-001
C8+ Heavies	3.48e-003	1.31e-002
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Total Components	100.00	3.77e+002

RICH GLYCOL AND PUMP GAS STREAM

Temperature: 58.00 deg. F
Pressure: 614.70 psia
Flow Rate: 7.19e-001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
-----	-----	-----
TEG	9.27e+001	3.71e+002
Water	4.19e+000	1.68e+001
Carbon Dioxide	2.10e-002	8.41e-002
Nitrogen	1.17e-002	4.67e-002
Methane	1.57e+000	6.29e+000
Ethane	4.94e-001	1.98e+000
Propane	2.19e-001	8.78e-001
Isobutane	4.82e-002	1.93e-001
n-Butane	8.26e-002	3.31e-001
Isopentane	3.07e-002	1.23e-001
n-Pentane	2.48e-002	9.95e-002

Cyclopentane	9.67e-005	3.87e-004
n-Hexane	1.35e-002	5.40e-002
Cyclohexane	1.59e-002	6.38e-002
Other Hexanes	2.57e-002	1.03e-001
Heptanes	4.88e-002	1.95e-001
Methylcyclohexane	1.82e-002	7.30e-002
2,2,4-Trimethylpentane	6.63e-005	2.66e-004
Benzene	1.80e-002	7.20e-002
Toluene	7.83e-002	3.14e-001
Ethylbenzene	7.64e-003	3.06e-002
Xylenes	3.98e-001	1.59e+000
C8+ Heavies	2.84e-002	1.14e-001

Total Components	100.00	4.00e+002

FLASH TANK OFF GAS STREAM

Temperature: 170.00 deg. F
Pressure: 52.70 psia
Flow Rate: 1.89e+002 scfh

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

Water	1.25e+000	1.12e-001
Carbon Dioxide	3.56e-001	7.79e-002
Nitrogen	3.32e-001	4.63e-002
Methane	7.81e+001	6.23e+000
Ethane	1.29e+001	1.93e+000
Propane	3.78e+000	8.31e-001
Isobutane	6.19e-001	1.79e-001
n-Butane	1.04e+000	3.01e-001
Isopentane	3.10e-001	1.11e-001
n-Pentane	2.46e-001	8.82e-002
Cyclopentane	7.48e-004	2.61e-004
n-Hexane	1.04e-001	4.47e-002
Cyclohexane	8.39e-002	3.51e-002
Other Hexanes	2.06e-001	8.84e-002
Heptanes	2.83e-001	1.41e-001
Methylcyclohexane	7.52e-002	3.67e-002
2,2,4-Trimethylpentane	3.87e-004	2.20e-004
Benzene	3.08e-002	1.20e-002
Toluene	8.26e-002	3.79e-002
Ethylbenzene	4.51e-003	2.38e-003
Xylenes	1.66e-001	8.80e-002
C8+ Heavies	6.11e-002	5.18e-002

Total Components	100.00	1.04e+001

FLASH TANK GLYCOL STREAM

Temperature: 170.00 deg. F
Flow Rate: 6.96e-001 gpm

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

TEG	9.51e+001	3.71e+002
Water	4.27e+000	1.67e+001
Carbon Dioxide	1.59e-003	6.22e-003

Nitrogen	1.02e-004	3.98e-004
Methane	1.42e-002	5.53e-002
Ethane	1.34e-002	5.21e-002
Propane	1.21e-002	4.71e-002
Isobutane	3.58e-003	1.40e-002
n-Butane	7.55e-003	2.94e-002
Isopentane	3.02e-003	1.18e-002
n-Pentane	2.89e-003	1.13e-002
Cyclopentane	3.23e-005	1.26e-004
n-Hexane	2.39e-003	9.32e-003
Cyclohexane	7.36e-003	2.87e-002
Other Hexanes	3.74e-003	1.46e-002
Heptanes	1.39e-002	5.40e-002
Methylcyclohexane	9.30e-003	3.63e-002
2,2,4-Trimethylpentane	1.17e-005	4.56e-005
Benzene	1.54e-002	6.00e-002
Toluene	7.07e-002	2.76e-001
Ethylbenzene	7.23e-003	2.82e-002
Xylenes	3.86e-001	1.51e+000
C8+ Heavies	1.59e-002	6.21e-002

Total Components	100.00	3.90e+002

FLASH GAS EMISSIONS

Flow Rate: 4.38e+002 scfh
Control Method: Combustion Device
Control Efficiency: 50.00

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

Water	5.00e+001	1.04e+001
Carbon Dioxide	2.87e+001	1.46e+001
Nitrogen	1.43e-001	4.63e-002
Methane	1.69e+001	3.12e+000
Ethane	2.78e+000	9.63e-001
Propane	8.17e-001	4.15e-001
Isobutane	1.34e-001	8.95e-002
n-Butane	2.25e-001	1.51e-001
Isopentane	6.68e-002	5.56e-002
n-Pentane	5.30e-002	4.41e-002
Cyclopentane	1.62e-004	1.31e-004
n-Hexane	2.25e-002	2.23e-002
Cyclohexane	1.81e-002	1.76e-002
Other Hexanes	4.45e-002	4.42e-002
Heptanes	6.11e-002	7.07e-002
Methylcyclohexane	1.62e-002	1.84e-002
2,2,4-Trimethylpentane	8.35e-005	1.10e-004
Benzene	6.65e-003	5.99e-003
Toluene	1.78e-002	1.89e-002
Ethylbenzene	9.74e-004	1.19e-003
Xylenes	3.59e-002	4.40e-002
C8+ Heavies	1.32e-002	2.59e-002

Total Components	100.00	3.01e+001

 Temperature: 212.00 deg. F
 Pressure: 14.70 psia
 Flow Rate: 2.41e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
-----	-----	-----
Water	9.60e+001	1.10e+001
Carbon Dioxide	2.22e-002	6.22e-003
Nitrogen	2.23e-003	3.98e-004
Methane	5.42e-001	5.53e-002
Ethane	2.72e-001	5.21e-002
Propane	1.68e-001	4.71e-002
Isobutane	3.77e-002	1.40e-002
n-Butane	7.97e-002	2.94e-002
Isopentane	2.48e-002	1.14e-002
n-Pentane	2.38e-002	1.09e-002
Cyclopentane	2.79e-004	1.24e-004
n-Hexane	1.66e-002	9.10e-003
Cyclohexane	4.99e-002	2.67e-002
Other Hexanes	2.51e-002	1.38e-002
Heptanes	8.33e-002	5.31e-002
Methylcyclohexane	5.35e-002	3.34e-002
2,2,4-Trimethylpentane	5.82e-005	4.23e-005
Benzene	1.13e-001	5.64e-002
Toluene	4.28e-001	2.51e-001
Ethylbenzene	3.71e-002	2.50e-002
Xylenes	1.93e+000	1.30e+000
C8+ Heavies	4.52e-002	4.90e-002
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Total Components	100.00	1.30e+001

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

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

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

Williams Ohio Valley Midstream LLC
DEWHURST DEHYDRATION 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 treated in the dehydrator.
2. Monitor inlet gas characteristics with annual sample collection and extended gas analysis.
3. Monitor dehydrator operating parameters, such as temperatures, pressures, and flow rates, as requisite to determine actual and potential emissions.
4. Monitor and record quantity of produced water transferred from the storage tank.

B. Recordkeeping

1. Maintain records of the amount of natural gas treated in the dehydrator.
2. Maintain records demonstrating the actual annual average benzene emissions are less than one ton per year.
3. Maintain records of the amount of produced water transferred from the storage tank.
4. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the dehydration unit and ancillary equipment.
5. 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
DEWHURST DEHYDRATION STATION
Application for 45CSR13 NSR Modification Permit
Attachment P - Public Notice

AIR QUALITY PUBLIC NOTICE
Notice of Application

Notice is given that Williams Ohio Valley Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a 45CSR13 NSR Modification Permit for the existing Dewhurst Dehydration Station, located on the southwest side of Buffalo Run Road, approximately 4.1 miles south-southeast of Jacksonburg, in Wetzel County, West Virginia. The latitude and longitude coordinates are 39.474° North and -80.625° West.

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

0.13	tons of nitrogen oxides per year
0.11	tons of carbon monoxide per year
20.14	tons of volatile organic compounds per year
0.36	tons of benzene per year
9.42	tons of total hazardous air pollutants per year
948	tons of carbon dioxide equivalent per year

The Applicant intends to implement changes w/in two (2) months of permit issuance.

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the _____ day of _____, 2015.

By: Williams Ohio Valley Midstream LLC
Mr. Don Wicburg
Vice President and General Manager
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: **\$1,000** (Not Applicable)
 - NESHAP Requirements: **\$2,500** (HH - DFT-01/1E and DSV-01/2E)
 - Total application fee is **\$3,500** [= \$1,000 minimum fee + \$2,500 additional charges]
-

Williams Ohio Valley Midstream LLC

DEWHURST DEHYDRATION STATION

Application for 45CSR13 New Source Review (NSR) Modification Permit

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

Williams Ohio Valley Midstream LLC

DEWHURST DEHYDRATION STATION

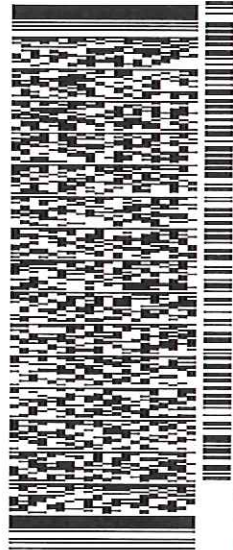
Application for 45CSR13 New Source Review (NSR) Modification Permit

ORIGIN D:OLA (412) 787-4197
 DANIEL ZAWASKI
 WILLIAMS
 2000 COMMERCE DRIVE
 PARK PLACE 2
 PITTSBURGH, PA 15275
 UNITED STATES US

SHIP DATE: 24 JUL 15
 ACTWGT: 2.00 LB
 CAD: 104268589/NET/3670
 BILL SENDER

TO BEVERLY MCKEONE
 WV DIV OF AIR QUALITY PERMITTING
 601 57TH STREET, SE

CHARLESTON WV 25304
 (304) 926-0499 X 1260 REF: 6000000620060034 6228 6925
 INV. DEPT.



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TRK# 7741 3162 7142
 0201

TUE - 28 JUL AA

** 2DAY **

SH CRWA 25304
 WV-US HTS



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