



Williams Ohio Valley Midstream LLC  
100 Teletech Drive, Suite 2  
Moundsville, WV 26041  
(304) 843-4559  
(304) 843-3196 fax

August 22, 2017  
**(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 Class II Administrative Update (R13-3289A)  
Williams Ohio Valley Midstream LLC  
Francis Compressor Station (Facility ID 051-00157)  
Moundsville, Marshall County, West Virginia**

Dear Ms. McKeone:

Williams Ohio Valley Midstream LLC (OVM) is submitting one (1) original paper copy and two (2) CD-ROMs of an Application for 45CSR13 New Source Review (NSR) Class II Administrative Update for the existing Francis Compressor Station, co-located at the Oak Grove Gas Plant at 5258 Fork Ridge Rd in Moundsville, Marshall County, West Virginia.

This application has been prepared and submitted to request the following updates to the facility's current air quality permit (R13-3289A, issued 01/25/17):

- Decrease the Estimated Volatile Organic Compound (VOC) and Hazardous Air Pollutant (HAP) Emissions Resulting from Application of Updated LDAR Control Credits Based on 500 ppm vs. 10,000 ppm Leak Definition (FUG-3/25E).
- These Decreases in VOC and HAP Emissions are Significantly Offset by:
  - Increases Resulting from Increasing the LDAR Component Count (Including a 15% Contingency)).
  - Increases Resulting from the Addition of "Mixed" (Gas and Light Liquid) Components and Emissions.
  - Increases Resulting from the Use of Light Liquid Emission Factors vs. Oil/Water Emission Factors.

The Facility-Wide Emissions Summary (including the Francis Compressor Station, Oak Grove Gas Plant, and Independence Compressor Station) is shown on the following page.

OVM requests that the updates to the Francis Compressor Station permit (R13-3289A) be incorporated into the Oak Grove Natural Gas Processing Plant Title V Operating Permit ((R30-05100157(MM02)), as requisite.

Williams Ohio Valley Midstream LLC  
 FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)  
 Application for Class II Administrative Update

Facility-Wide Emissions Summary [Tons per Year]

Criteria Pollutants	Potential Emissions					
	Francis - Old	Francis - Δ	Francis - New	Oak Grove	Independence	TOTAL
Nitrogen Oxides (NOX)	6.66	---	6.66	121.26	---	127.93
Carbon Monoxide (CO)	3.89	---	3.89	192.66	---	196.55
Volatile Organic Compounds (VOC) - Point	27.42	---	27.42	69.50	1.00	97.92
Volatile Organic Compounds (VOC) - Fugitive	2.77	(0.45)	2.32	42.50	0.06	44.89
Volatile Organic Compounds (VOC) - TOTAL	30.19	(0.45)	29.74	112.00	1.06	142.80
Sulfur Dioxide (SO2)	0.03	---	0.03	0.76	---	0.79
Particulate Matter (PM10/2.5)	0.49	---	0.49	10.68	---	11.18
Hazardous Air Pollutants (HAP)	Potential Emissions (Including Fugitives)					
	Francis - Old	Francis - Δ	Francis - New	Oak Grove	Independence	TOTAL
Acetaldehyde	0.12	---	0.12	---	---	0.12
Acrolein	0.08	---	0.08	---	---	0.08
Benzene	0.05	5.5E-04	0.05	1.86	0.06	1.97
Ethylbenzene	0.04	5.5E-04	0.04	2.04	0.06	2.14
Formaldehyde	1.65	---	1.65	0.12	---	1.77
n-Hexane	0.36	(0.03)	0.33	3.70	0.06	4.09
Methanol	0.04	---	0.04	---	---	0.04
Toluene	0.05	5.5E-04	0.05	1.96	0.06	2.06
2,2,4-TMP	0.04	5.5E-04	0.05	2.10	0.06	2.20
Xylenes	0.04	5.5E-04	0.04	2.05	0.06	2.15
Other HAP	0.01	---	0.01	0.01	---	0.02
Total HAP	2.48	(0.02)	2.45	13.83	0.35	16.64
Other Regulated Pollutants (Other than Criteria and HAP)	Potential Emissions (Including Fugitives)					
	Francis - Old	Francis - Δ	Francis - New	Oak Grove	Independence	TOTAL
Carbon Dioxide (CO <sub>2</sub> )	6,761	---	6,761	218,331	16	225,108
Methane (CH <sub>4</sub> )	81	---	81	374	292	748
Nitrous Oxide (N <sub>2</sub> O)	0.01	---	0.01	1	---	1
CO <sub>2</sub> equivalent (CO <sub>2</sub> e)	8,792	---	8,792	227,955	7,327	244,075

If you have any questions concerning this submittal or need additional information, please contact me by telephone at (412) 787-4787 or by e-mail at kristi.evans@williams.com.

Sincerely,



Kristi Evans  
 Environmental Specialist

Enclosures:

- Application for Class II Administrative Update
- Attachments A through S
- Check for Application Fee

**APPLICATION FOR  
CLASS II ADMINISTRATIVE UPDATE  
(R13-3289A)**

*For the:*

Williams Ohio Valley Midstream LLC

**FRANCIS COMPRESSOR STATION**

**(Located at the OVM Oak Grove Gas Plant)**

Marshall County, West Virginia

*Submitted to:*



**WEST VIRGINIA**

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

*Submitted by:*



**Williams Ohio Valley Midstream LLC**

100 Teletech Drive, Suite 2

Moundsville, WV 26041

*Prepared by:*



**EcoLogic Environmental Consultants, LLC**

864 Windsor Court

Santa Barbara, CA 93111

**August 2017**

**APPLICATION FOR  
CLASS II ADMINISTRATIVE UPDATE  
(R13-3289A)**

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
**(Located at the OVM Oak Grove Gas Plant)**  
Marshall County, West Virginia

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**APPLICATION FOR  
CLASS II ADMINISTRATIVE UPDATE  
(R13-3289A)**

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- **SECTION I.     General**
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-



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475  
[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

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

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

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

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

**Section I. General**

1. Name of applicant (as registered with the WV Secretary of State's Office): <b>WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM)</b>		2. Federal Employer ID No. (FEIN): <b>27-0856707</b>	
3. Name of facility (if different from above): <b>FRANCIS COMPRESSOR STATION (FCS) (AT THE OAK GROVE GAS PLANT (OGGP))</b>		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: <b>WILLIAMS OHIO VALLEY MIDSTREAM LLC (OVM) 100 TELETECH DR, STE 2 MOUNDSVILLE, WV 26041</b>		5B. Facility's present physical address: <b>~0.4 MILES NORTH OF 5258 FORK RIDGE ROAD ~3.7 MILES SE OF MOUNDSVILLE MOUNDSVILLE, MARSHALL COUNTY, WV 26041</b>	
6. <b>West Virginia Business Registration.</b> 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 <b>Certificate of Incorporation/Organization/Limited Partnership</b> (one page) including any name change amendments or other Business Registration Certificate as <b>Attachment A</b> . – If NO, provide a copy of the <b>Certificate of Authority/Authority of L.L.C./Registration</b> (one page) including any name change amendments or other Business Certificate as <b>Attachment A</b> .			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: <b>THE WILLIAMS COMPANIES, INC.</b>			
8. Does the applicant own, lease, have an option to buy, or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – If YES, please explain: <b>APPLICANT OWNS THE PROPERTY</b> – If NO, you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be <b>constructed, modified, relocated, administratively updated</b> or <b>temporarily permitted</b> (e.g., coal preparation plant, primary crusher, etc.): <b>FRANCIS: SIC 1389 - OIL AND GAS FIELD SERVICES, NEC.</b> <b>OGGP: SIC 1321 - NATURAL GAS LIQUIDS</b>		10. North American Industry Classification System (NAICS) code for the facility: <b>FRANCIS: 213112 - SUPPORT ACTIVITIES FOR OIL AND GAS OPERATIONS</b> <b>OGGP: 211112 - NATURAL GAS LIQUIDS EXTRACTION</b>	
11A. DAQ Plant ID No. (existing facilities): <b>FRANCIS COMPRESSOR STATION: 051-00157</b>		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities): <b>R13-3070A (OAK GROVE) - 01/05/16</b> <b>R30-05100157(MM02) (OAK GROVE) - 05/02/17</b> <b>R13-3289A (FRANCIS CS) - 01/25/17</b> <b>PD15-057 (INDEPENDENCE CS) - 08/12/15</b>	

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

<p><b>12A.</b> Directions to the facility:</p> <ul style="list-style-type: none"> <li>– For <b>Modifications, Administrative Updates</b> or <b>Temporary permits</b> at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road;</li> <li>– For <b>Construction</b> or <b>Relocation permits</b>, please provide directions to the <i>proposed new site location</i> from the nearest state road. Include a <b>MAP</b> as <b>Attachment B</b>.</li> </ul> <p><b>FROM LAFAYETTE AVE IN MOUNDSVILLE:</b>  <b>A. HEAD EAST ONTO 12TH ST ~1.1 MI;</b>      <b>C. ENTRANCE TO SITE IS ON THE LEFT.</b>  <b>B. CONTINUE ONTO FORK RIDGE RD ~5.4 MI;</b></p>		
<p><b>12.B.</b> New site address (if applicable): <b>NA</b></p>	<p><b>12C.</b> Nearest city or town: <b>MOUNDSVILLE</b></p>	<p><b>12D.</b> County: <b>MARSHALL</b></p>
<p><b>12.E.</b> UTM Northing (KM): <b>4,413.806 KM NORTHING</b></p>	<p><b>12F.</b> UTM Easting (KM): <b>526.243 KM EASTING</b></p>	<p><b>12G.</b> UTM Zone: <b>17S</b></p>
<p><b>13.</b> Briefly describe the proposed change(s) at the facility:  <b>THIS APPLICATION IS PREPARED AND SUBMITTED TO:</b></p> <ul style="list-style-type: none"> <li>• <b>DECREASE THE ESTIMATED VOLATILE ORGANIC COMPOUND (VOC) AND HAZARDOUS AIR POLLUTANTS RESULTING FROM APPLICATION OF UPDATED LDAR CONTROL CREDITS BASED ON 500 PPM VS. 10,000 PPM LEAK DEFINITION.</b></li> <li>• <b>THESE DECREASES ARE SIGNIFICANTLY OFFSET BY:</b> <ul style="list-style-type: none"> <li>- <b>INCREASES RESULTING FROM AN INCREASE IN LDAR COMPONENT COUNT (INCLUDING A 15% CONTINGENCY).</b></li> <li>- <b>INCREASES RESULTING FROM THE ADDITION OF "MIXED" (BOTH GAS AND LIGHT LIQUID) COMPONENTS.</b></li> <li>- <b>INCREASES RESULTING FROM USE OF LIGHT LIQUID EMISSION FACTORS VS. OIL/WATER EMISSION FACTORS.</b></li> </ul> </li> </ul>		
<p><b>14A.</b> Provide the date of anticipated installation or change: <b>NA</b></p> <ul style="list-style-type: none"> <li>– If this is an <b>After-The-Fact</b> permit application, provide the date upon which the proposed change did happen: <b>NA</b></li> </ul>	<p><b>14B.</b> Date of anticipated Start-Up if a permit is granted: <b>NA</b></p>	
<p><b>14C.</b> Provide a <b>Schedule</b> of the planned <b>Installation</b> of/<b>Change</b> to and <b>Start-Up</b> of each of the units proposed in this permit application as <b>Attachment C</b> (if more than one unit is involved).</p>		
<p><b>15.</b> Provide maximum projected <b>Operating Schedule</b> of activity/activities outlined in this application:  Hours Per Day: <b>24</b>      Days Per Week: <b>7</b>      Weeks Per Year: <b>52</b></p>		
<p><b>16.</b> Is demolition or physical renovation at an existing facility involved?    <input type="checkbox"/> <b>YES</b>    <input checked="checked" type="checkbox"/> <b>NO</b></p>		
<p><b>17. Risk Management Plans.</b> If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see <a href="http://www.epa.gov/ceppo">www.epa.gov/ceppo</a>), submit your <b>Risk Management Plan (RMP)</b> to U.S. EPA Region III.</p>		
<p><b>18. Regulatory Discussion.</b> List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (<i>if known</i>). A list of possible applicable requirements is also included in 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 <b>Attachment D</b>.</p>		

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

<p><b>19.</b> Include a check payable to WVDEP – Division of Air Quality with the appropriate <b>application fee</b> (per 45CSR22 and 45CSR13).</p>
<p><b>20.</b> Include a <b>Table of Contents</b> as the first page of your application package.</p>
<p><b>21.</b> Provide a <b>Plot Plan</b>, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as <b>Attachment E</b> (Refer to <b>Plot Plan Guidance</b>).</p> <ul style="list-style-type: none"> <li>– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).</li> </ul>
<p><b>22.</b> Provide a <b>Detailed Process Flow Diagram(s)</b> showing each proposed or modified emissions unit, emission point and control device as <b>Attachment F</b>.</p>
<p><b>23.</b> Provide a <b>Process Description</b> as <b>Attachment G</b>.</p> <ul style="list-style-type: none"> <li>– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).</li> </ul>
<p align="center"><b>All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.</b></p>

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

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

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

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

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

<input type="checkbox"/> Bulk Liquid Transfer	<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 type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	

**General Emission Unit, specify:**

- **COMPRESSOR ENGINE EMISSIONS – 1,380 BHP CAT G3516B (CE-01/22E)**
- **PIPING AND EQUIPMENT FUGITIVES (FUG-3/25E)**

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

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

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

**Other Collectors, specify:**

- **OXIDATION CATALYST (1-OXCAT) (FOR COMPRESSOR ENGINE (CE-01/22E))**

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: 9/22/2017  
(Please use blue ink)

<b>35B.</b> Printed name of signee: <b>PAUL V. HUNTER</b>	<b>35C.</b> Title: <b>VICE PRESIDENT</b>
<b>35D.</b> E-mail: <b>PAULV.HUNTER@WILLIAMS.COM</b>	<b>35E.</b> Phone: <b>(412) 787-5561</b>
	<b>35F.</b> FAX: <b>(412) 787-6002</b>
<b>36A.</b> Printed name of contact person: <b>KRISTI EVANS</b> <b>JOE MARECIC</b>	<b>36B.</b> Title: <b>ENVIRONMENTAL SPECIALIST</b> <b>SUPERVISOR, EH&amp;S</b>
<b>36C.</b> E-mail: <a href="mailto:KRISTI.EVANS@WILLIAMS.COM">KRISTI.EVANS@WILLIAMS.COM</a> <a href="mailto:JOE.MARECIC@WILLIAMS.COM">JOE.MARECIC@WILLIAMS.COM</a>	<b>36D.</b> Phone: <b>(412) 787-4787</b> <b>(304) 843-3188</b>
	<b>36E.</b> FAX: <b>(412) 787-6002</b> <b>(304) 843-3196</b>

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

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

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

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

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

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

## **ATTACHMENT A**

### **Business Certificate**

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“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.”

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

# State of West Virginia



## Certificate

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

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

**CAIMAN EASTERN MIDSTREAM, LLC**

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

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

changing the name of the limited liability company to

**WILLIAMS OHIO VALLEY MIDSTREAM LLC**

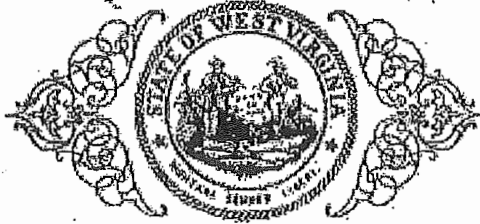


*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
May 15, 2012*

*Natalie E. Tennant*

*Secretary of State*

# State of West Virginia



## Certificate

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

**CAIMAN EASTERN MIDSTREAM, LLC**

Control Number: 99GIS

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

Therefore, I hereby issue this

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

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

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



*Natalie E. Tennant*

Secretary of State

## ATTACHMENT B

### Location/Topographic Map

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“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.”

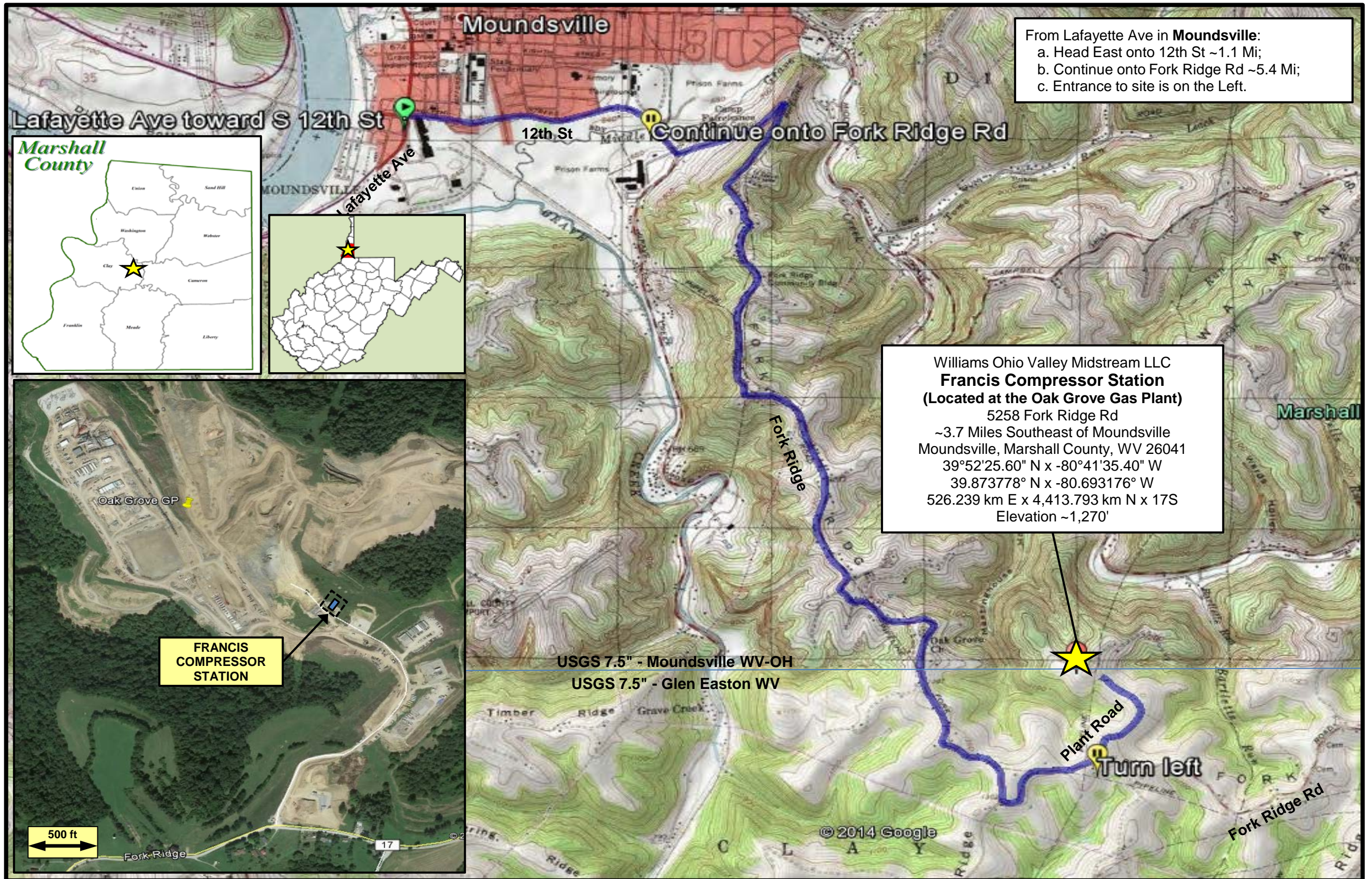
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- **Address:**  
Oak Grove Gas Plant  
5258 Fork Ridge Rd  
~3.7 Miles Southeast of Moundsville  
Moundsville, Marshall County, WV 26041
  
  - **Latitude and Longitude:**  
39°52'25.60" North x -80°41'35.40" West  
39.8738° North x -80.6932° West
  
  - **UTM:**  
526.239 km East x 4,413.793 km North x 17S
  
  - **Directions:**  
From Lafayette Ave in Moundsville:
    - a. Head East onto 12th St ~1.1 Mi;
    - b. Continue onto Fork Ridge Rd ~5.4 Mi;
    - c. Entrance to site is on the left.
  
  - **USGS:**  
7.5" Topographic – Moundsville WV-OH – 1997  
7.5" Topographic – Glen Easton WV – 1960
  
  - **Elevation:**  
~1,270'
-



Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 (Located at the Oak Grove Gas Plant)  
 Application for 45CSR13 NSR Construction Permit  
 Attachment B

**LOCATION (TOPO) MAP**





## **ATTACHMENT C**

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

---

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

---

**The OVM Francis Compressor Station is an existing operation (w/ ongoing, permitted, construction and production). This application is prepared and submitted to:**

- **Decrease the Estimated Volatile Organic Compound (VOC) and Hazardous Air Pollutant (HAP) Emissions Resulting from Application of Updated LDAR Control Credits Based on 500 ppm vs. 10,000 ppm Leak Definition (FUG-3/25E).**
- **These Decreases in VOC and HAP Emissions are Significantly Offset by:**
  - **Increases Resulting from Increasing the LDAR Component Count (Including a 15% Contingency)).**
  - **Increases Resulting from the Addition of "Mixed" (Gas and Light Liquid) Components and Emissions.**
  - **Increases Resulting from the Use of Light Liquid Emission Factors vs. Oil/Water Emission Factors.**

**There are no proposed additional installations or changes to the subject facility.**

---

## **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  
**FRANCIS COMPRESSOR STATION**  
Application Class II Administrative Update

**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 compressor stations. Applicability to the Francis Compressor Station (FCS), located at the Oak Grove Gas Plant (OGGP), has been determined as follows:

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

This rule does NOT apply to the FCS or to the OGGP because the total PTE for the entire facility qualifies as a “PSD Minor Source” for each regulated pollutant; as follows:

- NO<sub>x</sub>: 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
- SO<sub>2</sub>: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- PM<sub>10/2.5</sub>: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy

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

This rule does NOT apply to the FCS or to the OGGP. The operations are in Marshall County which is designated as Non-Attainment for Sulfur Dioxide (SO<sub>2</sub>) and as Attainment/Unclassified/Maintenance for all other criteria pollutants. (As of 10/01/15, see - <http://www3.epa.gov/airquality/greenbook/ancl.html>.) The entire facility qualifies as an “NNSR Minor Source” as follows:

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

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

This rule does NOT apply to the FCS or to the OGGP because the entire facility qualifies as a “HAP Area Source” as follows:

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

**4. Title V Operating Permit (TVOP)** [Applicable]

This rule does apply. This application to update the FCS operations is also an application to update the Title V Operating Permit revision at the OGGP.

## B. Applicability of Federal Regulations

The following federal regulations are potentially applicable to natural gas compressor stations. Applicability to the Francis Compressor Station (FCS), located at the Oak Grove Gas Plant (OGGP), has been determined as follows:

### 1. **NSPS A, General Provisions**

40CFR§60.1-§60.19

[Applicable]

This rule does apply to all sources subject to an NSPS (unless a specific provision is excluded within the source NSPS). Requirements include notification (§60.7); monitoring (§60.7); recordkeeping (§60.11); and reporting (§60.18).

### 2. **NSPS A, Control Devices - Flares**

40CFR§60.18(b)

[NOT Applicable]

This rule does NOT apply because there is no flare at the FCS.

### 3. **NSPS D (also Da, Db, and Dc), Steam Generating Units**

40CFR§60.40-§60.48

[NOT Applicable]

These rules do NOT apply because there is no boiler (or heater) at the FCS.

### 4. **NSPS K (also Ka and Kb), Volatile Organic Liquid Storage Vessels**

40CFR§60.40-§60.48

[NOT Applicable]

This rule does NOT apply because there is no tank with capacity  $\geq 75$  m<sup>3</sup> (471.7 bbl or 19,813 gal) that is used to store volatile organic liquids (VOL) at the FCS (§60.110(a)).

### 5. **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 FCS (§60.330).

### 6. **NSPS KKK, Leaks from Natural Gas Processing Plants**

40CFR§60.630-§60.636

[NOT Applicable]

This rule does NOT apply because the FCS, while located at the Oak Grove Gas Plant, commenced construction after 08/23/11 (§60.630(b)). (See NSPS OOOOa.)

### 7. **NSPS LLL, Onshore Natural Gas Processing: SO<sub>2</sub> Emissions**

40CFR§60.640-§60.648

[NOT Applicable]

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

### 8. **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 FCS (§60.4200(a)).

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

40CFR§60.4230-§60.4248

[Applicable]

This rule does apply to the 1,380 bhp Caterpillar G3516B compressor engine (CE-01/22E) because the maximum engine power is greater than 500 HP and the engine was manufactured on or after 07/01/07 (§60.4230(a)(4)(i)).

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

**10. 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 FCS (§60.4300).

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

40CFR§60.5360-§60.5430

[NOT Applicable]

This rule does NOT apply because the FCS is subject to NSPS OOOOa instead.

**12. NSPS OOOOa, Crude Oil and Natural Gas Production**

40CFR§60.5360a-§60.5430a

[Applicable]

This rule does apply to the reciprocating compressor driven by the CAT G3516B engine (CE-01/22E) and the electric motor driven reciprocating compressor because the FCS is located within the natural gas production segment and the compressors commenced construction after 09/18/15 (§60.5360a and §60.5365a(c)).

Requirements include replacing rod packing systems on a specified schedule (§60.5385a(a)) and notification, monitoring, recordkeeping and reporting (§60.5410a(c), §60.5415a(c), §60.5420a(b)(1) and §60.5420a(b)(4)).

This rule does apply to continuous bleed natural gas-driven pneumatic controllers because the FCS is aggregated with the OGGP.

Requirements include utilizing compressed air or having a natural gas bleed rate of zero (§60.5390a).

This rule does apply to sources of fugitive emissions because the FCS is aggregated with the OGGP.

Requirements include monitoring and repair of valves, flanges, connectors, pumps, pressure relief devices and open-ended valves or lines. The equipment leak standards are specified in §60.5400a. Also, subject to the notification, recordkeeping, and reporting as specified in §60.5420a.

**13. NESHAP Part 61 - Designated Source Standards**

40CFR§61.01-§61.359

[NOT Applicable]

This rule does NOT apply because the FCS is NOT a NESHAP Designated Facility (or Source).

**14. NESHAP A (Part 63 (aka, MACT)) - General Provisions**

40CFR§63.1§63.16

[NOT Applicable]

This rule does NOT apply because the FCS is NOT subject to any requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) or associated Maximum Achievable Control Technology (MACT) requirements (§63.1(a)).

(Note: The Compressor Engine (CE-01/22E) complies with NESHAP ZZZZ by compliance with NSPS JJJJ (§63.6590(a)(2)(iii)), no other requirements apply.)

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

40CFR§63.760-§63.779

[NOT Applicable]

This rule does NOT apply because there is no triethylene glycol dehydrator at the FCS (§63.760(b)(2)).

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

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

40CFR§63.1270-§63.1289

[NOT Applicable]

This rule does NOT apply because the FCS and the OGGP are NOT a natural gas transmission or storage facility transporting or storing natural gas prior to local distribution (§63.1270(a)).

**17. 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 FCS (§63.6080).

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

40CFR§63.6580-§63.6675

[Applicable]

This rule does apply to the 1,380 bhp CAT G3516B Compressor Engine (CE-01/22E). It is "new"; i.e., commenced construction or reconstruction on or after 06/12/06 (§63.6590(a)(2)(iii)) so the only requirement is compliance with §60.4230-§60.4248 (NSPS JJJJ) for Spark Ignition Internal Combustion Engines.

**19. 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 there is no boiler or heater at the FCS (§63.7485).

**20. 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 there is no boiler or heater at the FCS (§63.11193).

**21. Chemical Accident Prevention Provisions**

40CFR§68.1-§68.220

[NOT Applicable]

This rule does NOT apply because the FCS does NOT store more than a threshold quantity of a regulated substance in a process (§68.115).

**22. Compliance Assurance Monitoring (CAM)**

40CFR§64.1-§64.10

[NOT Applicable]

This rule does NOT apply because there are no pollutant-specific emission units subject to an emissions limitation or standard (e.g., NSPS, NESHAP, HAP, NSR, PSD, SIP) with pre-controlled emissions greater than Title V major source thresholds, that requires an add-on control device to achieve compliance (§64.2(a)(2)).

**23. Mandatory Greenhouse Gases (GHG) Reporting**

40CFR§98.1-§98.9

[Potentially Applicable]

This rule does apply because the FCS has been aggregated with the OGGP and the combined operations is a listed source category and the combined heat input capacity of the stationary fuel combustion units is  $\geq 30$  MMBtu/hr (§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 Oak Grove Gas Plant (OGGP) located next to Francis Compressor Station. The Oak Grove Gas Plant meets the common-sense definition of being “contiguous” with or “adjacent” to the subject facility. There are no other Williams owned facilities (other than OGGP) located within ½ mile of Francis Compressor Station.

The subject facility compresses gas produced from upstream production wells located in northern West Virginia. The subject facility is located at the Oak Grove Gas Plant owned and operated by Williams Ohio Valley Midstream LLC.

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

### **iii) Common Control**

Williams OVM operates under its parent company The Williams Companies, Inc. (Williams) and is the sole operator of the subject facility. The closest Williams-operated facility to the subject facility is the Oak Grove Gas Plant, located next to Francis Compressor Station. The OGGP is “contiguous” with or “adjacent” to the subject facility.

The production wells 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 any production well or company in West Virginia that may send natural gas to the subject facility.

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

At this time, contracts are in place for the subject facility to compress 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 upstream production wells.

### **Summary**

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

However, as the Francis Compressor Station is considered “contiguous” or “adjacent” to the Oak Grove Gas Plant, and both facilities are owned and operated by Williams, these two facilities should be aggregated together for determining major source status.

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

The following state regulations are potentially applicable to natural gas compressor stations. Applicability to the Francis Compressor Station (FCS), located at the Oak Grove Gas Plant (OGGP), has been determined as follows:

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

45CSR2

[NOT Applicable]

This rule does NOT apply because there is no indirect heat exchanger at the FCS.

**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.

**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 FCS.

**4. Prevent and Control Air Pollution from the Emission of Sulfur Oxides**

45CSR10

[NOT Applicable]

This rule does NOT apply because there is no “fuel burning unit” at the FCS.

**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 Construction Permit and has published the required Class I legal advertisement notifying the public of this application and paid the appropriate application fee.

**6. Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants for Prevention of Significant Deterioration**

45CSR14

[NOT Applicable]

The rule does NOT apply because the FCS is neither a new PSD major source of pollutants nor is the proposed facility a modification to an existing PSD major source.

**7. Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60**

45CSR16

[Applicable]

The rule does apply to this source by reference to §40CFR60 Subparts JJJJ and OOOO. The FCS is subject to the notification, testing, monitoring, recordkeeping and reporting requirements of these Subparts.

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

45CSR19

[NOT Applicable]

This rule does NOT apply. The FCS location is designated as either “Maintenance” or “Attainment/Unclassified” for all criteria pollutants, except for sulfur dioxide. The plant-wide potential-to-emit (PTE) sulfur dioxide is less than applicable thresholds.



- 9. Regulation of Volatile Organic Compounds (VOC)**  
45CSR21 [NOT Applicable]  
This rule does NOT apply because the FCS 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. Williams Ohio Valley Midstream LLC 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 FCS is NOT located in Putnam, Kanawha, Cabell, Wayne, Wood, or Greenbrier Counties (§45-29-1).
- 14. Requirements for Operating Permits**  
45CSR30 [Applicable]  
This rule does apply. This application to update the FCS operations is also an application to update the Title V Operating Permit revision at the OGGP (§45-30-4.1.a.2).
- 15. Emission Standards for Hazardous Air Pollutants (HAP)**  
45CSR34 [NOT Applicable]  
This rule does NOT apply because the FCS is NOT subject to any requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) or associated Maximum Achievable Control Technology (MACT) requirements (§63.1(a)).

## **ATTACHMENT E**

### **Plot Plan**

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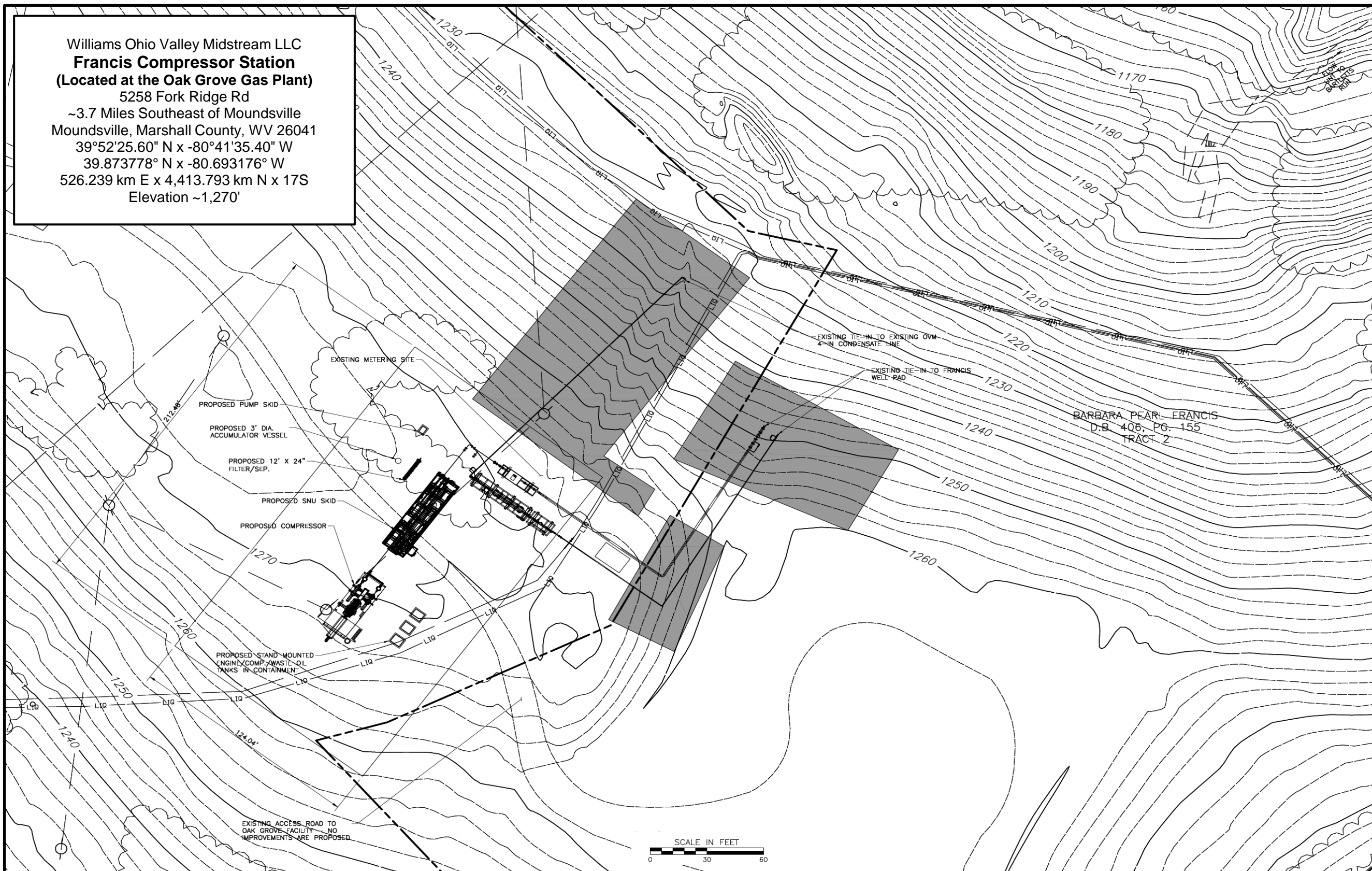
“21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E.”

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- **Plot Plan – Francis Compressor Station**
  - **Plot Plan – Oak Grove Gas Plant**
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 (Located at the Oak Grove Gas Plant)  
 Application for Class II Administrative Update  
**Attachment E**  
**PLOT PLAN**

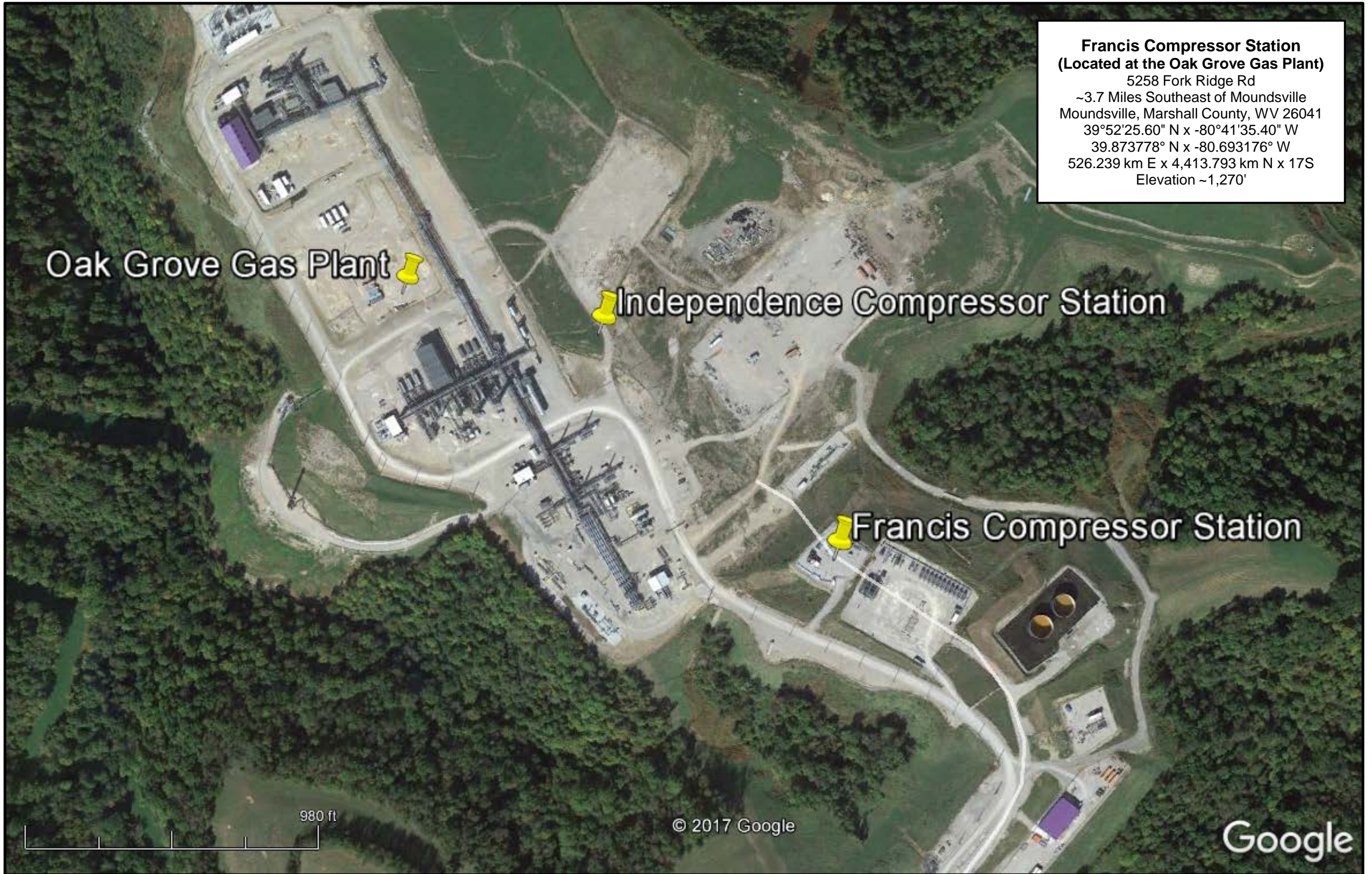
Williams Ohio Valley Midstream LLC  
**Francis Compressor Station**  
 (Located at the Oak Grove Gas Plant)  
 5258 Fork Ridge Rd  
 ~3.7 Miles Southeast of Moundsville  
 Moundsville, Marshall County, WV 26041  
 39°52'25.60" N x -80°41'35.40" W  
 39.873778° N x -80.693176° W  
 526.239 km E x 4,413.793 km N x 17S  
 Elevation ~1,270'





Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
(Located at the Oak Grove Gas Plant)  
Application for Class II Administrative Update  
**Attachment E**

**Aerial View**





**ATTACHMENT F**  
**Detailed Process Flow Diagram(s) (PFD)**

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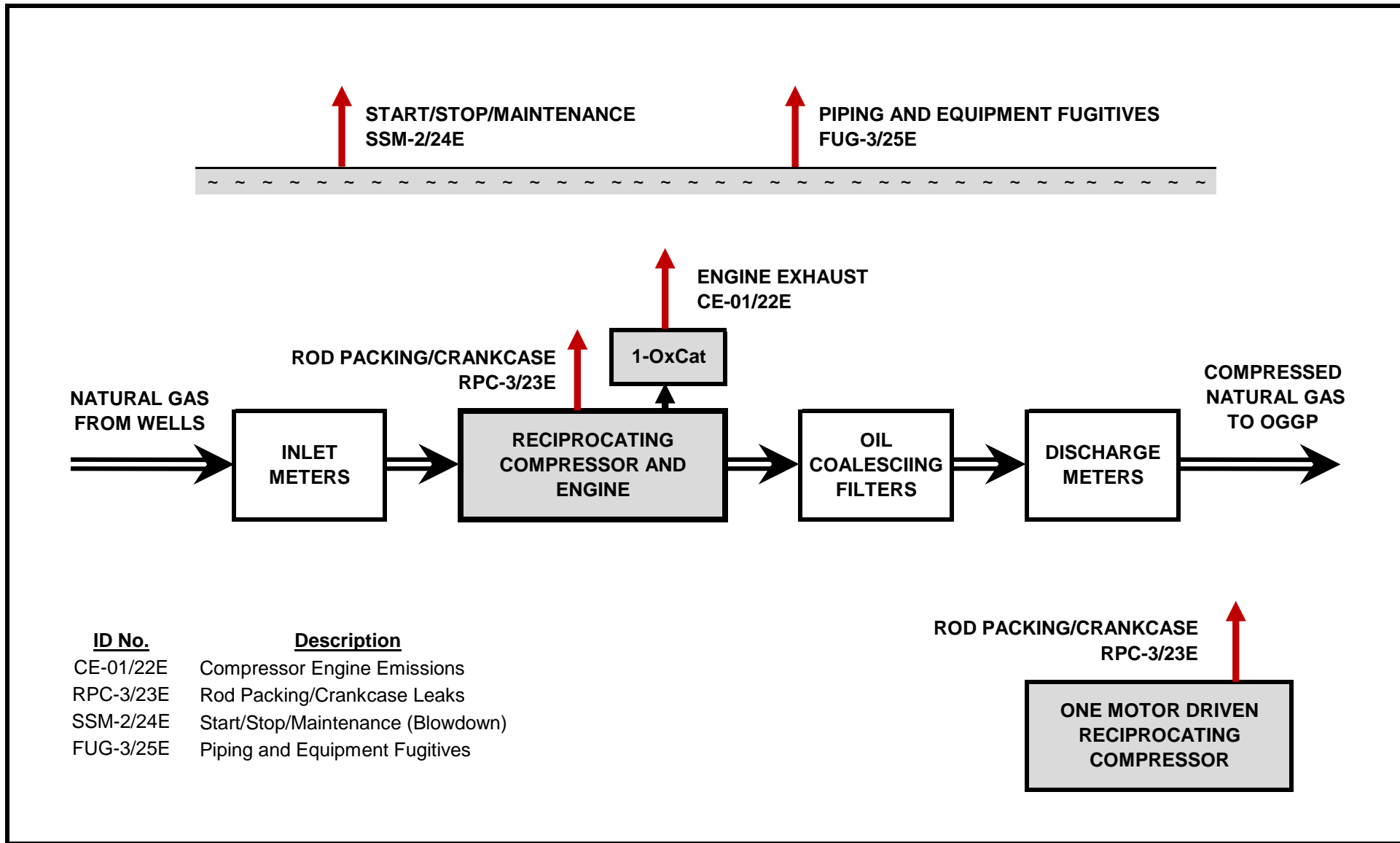
“22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as Attachment F.”

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- **Process Flow Diagram (PFD) – Francis Compressor Station**
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 (Located at the Oak Grove Gas Plant)  
 Application for Class II Administrative Update  
**Attachment F**

**PROCESS FLOW DIAGRAM (PFD)**



<u>ID No.</u>	<u>Description</u>
CE-01/22E	Compressor Engine Emissions
RPC-3/23E	Rod Packing/Crankcase Leaks
SSM-2/24E	Start/Stop/Maintenance (Blowdown)
FUG-3/25E	Piping and Equipment Fugitives

## **ATTACHMENT G**

### **Process Description**

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“23. Provide a **Process Description** as Attachment G. Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable). “

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- **Process Description**
    - A. Project Overview
    - B. Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)
    - C. Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)
    - D. Start/Stop/Maintenance (Including Blowdown) (SSM-2/24E)
    - E. Piping and Equipment Fugitives (FUG-3/25E)
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
Application for Class II Administrative Update

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

A. Project Overview

Williams Ohio Valley Midstream LLC operates the Francis Compressor Station at the inlet of the existing Oak Grove Gas Plant at 5258 Fork Ridge Rd in Moundsville, Marshall County, WV (See Appendix B – Site Location Map).

B. Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)

One (1) natural gas-fueled CAT G3516B compressor engine is used at the facility. This is a new, four-stroke, lean burn (4SLB) engine w/ an oxidation catalyst (OxCat).

C. Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)

The compressors (engine and electric motor driven) and engine operations result in emissions from the wear of mechanical joints, seals, and rotating surfaces over time.

D. Start/Stop/Maintenance (Including Blowdown) (SSM-2/24E)

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

E. Piping and Equipment Fugitives (FUG-3/25E)

Piping and process equipment generate leaks from different component types (connectors, valves, pumps, etc.)



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

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

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- **NATURAL GAS**
    - Gas Analysis Summary – Design Basis
    - Representative Inlet Gas Analysis – Design Basis
  
  - **FLASH GAS**
    - Gas Analysis Summary – Design Basis
  
  - **SAFETY DATA SHEETS (SDS):** **(SDS’s are available upon request)**
    - Wellhead Natural Gas
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment H - SDS (etc.)**

**Inlet Gas Analysis Summary - Design Basis**

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Water	---	H2O	18	---	---	---	---	---
Nitrogen	7727-37-9	N2	32.00	0.452	0.00452	0.145	0.654	381.14
Hydrogen Sulfide	2148-87-8	H2S	34.08	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.01	0.160	0.00160	0.070	0.318	185.56
Methane*	75-82-8	CH4	16.04	71.877	0.71877	11.531	52.109	30,385.73
Ethane*	74-84-0	C2H6	30.07	17.518	0.17518	5.267	23.804	13,880.75
Propane**	74-98-6	C3H8	44.10	6.744	0.06744	2.974	13.439	7,836.49
i-Butane**	75-28-5	C4H10	58.12	0.688	0.00688	0.400	1.807	1,053.75
n-Butane**	106-97-8	C4H10	58.12	1.674	0.01674	0.973	4.398	2,564.54
Cyclopentane**	287-92-3	C5H10	70.13	0.002	0.00002	0.001	0.006	3.70
i-Pentane**	78-78-4	C5H12	72.15	0.263	0.00263	0.190	0.857	500.03
n-Pentane**	109-66-0	C5H12	72.15	0.323	0.00323	0.233	1.053	614.10
Cyclohexane**	110-82-7	C6H12	84.16	0.007	0.00007	0.006	0.027	15.52
Other Hexanes**	varies	C6H14	86.18	---	---	---	---	---
Methylcyclohexane**	varies	C7H14	98.19	0.009	0.00009	0.009	0.040	23.29
Heptanes**	varies	C7H16	100.20	0.025	0.00025	0.025	0.113	66.01
C8+ Heavies**	varies	C8H18+	130.3 est	0.184	0.00184	0.239	1.081	630.27
Benzene***	71-43-2	C6H6	78.11	0.001	0.00001	0.001	0.004	2.06
Ethylbenzene***	100-41-4	C8H10	106.17	0.001	0.00001	0.001	0.005	2.80
n-Hexane***	110-54-3	C6H14	86.18	0.065	0.00065	0.056	0.253	147.61
Toluene***	108-88-3	C7H8	92.14	0.002	0.00002	0.002	0.008	4.86
2,2,4-TMP (i-Octane)***	540-84-1	C8H18	114.23	0.001	0.00001	0.001	0.005	3.01
Xylenes***	1330-20-7	C8H10	106.17	0.004	0.00004	0.004	0.019	11.19

<b>Totals:</b>	<b>100.00</b>	<b>1.00</b>	<b>22.13</b>	<b>100.00</b>	<b>58,312</b>
<b>Total THC:</b>	<b>99.39</b>	<b>0.99</b>	<b>21.91</b>	<b>99.03</b>	<b>57,746</b>
<b>Total VOC:</b>	<b>9.99</b>	<b>0.10</b>	<b>5.12</b>	<b>23.12</b>	<b>13,479</b>
<b>Total HAP:</b>	<b>0.07</b>	<b>0.001</b>	<b>0.07</b>	<b>0.29</b>	<b>172</b>

\* = Hydrocarbon (HC)

\*\* = also Volatile Organic Compound (VOC)

\*\*\* = also Hazardous Air Pollutant (HAP)

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

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (120% Min)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.160	0.318	186	0.259	0.514	300
Methane	75-82-8	CH4	71.877	52.109	30,386	86.340	62.594	36,500
Ethane	74-84-0	C2H6	17.518	23.804	13,881	1.169	8.596	4,446
VOC	Various	C3+	9.993	23.116	13,479	12.232	28.296	16,500
Benzene	71-43-2	C6H6	0.001	0.004	2	0.010	0.034	20
Ethylbenzene	110-54-3	C8H10	0.001	0.005	3	0.007	0.034	20
n-Hexane	100-41-4	C6H14	0.065	0.253	148	0.079	0.309	180
Toluene	108-88-3	C7H8	0.002	0.008	5	0.008	0.034	20
2,2,4-TMP (i-Octane)	540-84-1	C8H18	0.001	0.005	3	0.007	0.034	20
Xylenes	1330-20-7	C8H10	0.004	0.019	11	0.007	0.034	20
Total HAP	Various	C6+	0.074	0.294	172	0.121	0.480	280

Inlet Gas Analysis Summary - Design Basis

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for 45CSR13 NSR Construction Permit  
**Attachment H - MSDS (etc.)**

## Representative Inlet Gas Analysis - Design Basis

### COMPOSITIONAL ANALYSIS OF THE SEPARATOR GAS, OIL AND MATHEMATICALLY RECOMBINED WELLSTREAM THROUGH C<sub>11+</sub>

AB Resources, LLC  
 Cavenney No. 1-H

SEPARATOR GOR.....: 12809 Scf/Sep Bbl  
 SEPARATOR PRESSURE.....: 183 psig  
 SEPARATOR TEMPERATURE.....: 49 °F

Component	SEPARATOR GAS		SEPARATOR OIL		WELLSTREAM	
	Mole%	* GPM	Mole %	Liquid Volume %	Mole %	* GPM
Hydrogen Sulfide	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.452	0.000	0.021	0.006	0.420	0.000
Carbon Dioxide	0.160	0.000	0.017	0.007	0.149	0.000
Methane	71.877	0.000	5.379	2.282	66.896	0.000
Ethane	17.518	4.723	8.784	5.880	16.864	4.547
Propane	6.744	1.871	12.655	8.716	7.187	1.994
Iso-butane	0.688	0.227	3.269	2.676	0.881	0.291
N-butane	1.672	0.531	11.633	9.175	2.418	0.768
2-2 Dimethylpropane	0.010	0.004	0.067	0.065	0.014	0.006
Iso-pentane	0.263	0.097	4.857	4.448	0.607	0.224
N-pentane	0.323	0.118	7.835	7.104	0.886	0.323
2-2 Dimethylbutane	0.005	0.002	0.143	0.149	0.015	0.006
Cyclopentane	0.002	0.001	0.000	0.000	0.002	0.001
2-3 Dimethylbutane	0.007	0.003	0.368	0.378	0.034	0.014
2 Methylpentane	0.046	0.019	2.187	2.272	0.206	0.086
3 Methylpentane	0.026	0.011	1.429	1.460	0.131	0.054
Other Hexanes	0.000	0.000	0.000	0.000	0.000	0.000
n-Hexane	0.065	0.027	4.457	4.587	0.394	0.163
Methylcyclopentane	0.006	0.002	0.404	0.358	0.036	0.013
Benzene	0.001	0.000	0.064	0.045	0.006	0.002
Cyclohexane	0.007	0.002	0.680	0.579	0.057	0.020
2-Methylhexane	0.011	0.005	1.419	1.651	0.116	0.055
3-Methylhexane	0.010	0.005	1.527	1.754	0.124	0.057
2,2,4 Trimethylpentane	0.000	0.000	0.000	0.000	0.000	0.000
Other Heptanes	0.009	0.004	1.202	1.309	0.098	0.043
n-Heptane	0.016	0.007	3.178	3.669	0.253	0.118
Methylcyclohexane	0.009	0.004	1.666	1.676	0.133	0.054
Toluene	0.002	0.001	0.318	0.267	0.026	0.009
Other C-8's	0.018	0.009	4.694	5.507	0.368	0.174
n-Octane	0.008	0.004	2.037	2.611	0.160	0.083
Ethylbenzene	0.001	0.000	0.291	0.281	0.023	0.009
M&P-Xylene	0.003	0.001	0.279	0.271	0.024	0.009
O-Xylene	0.001	0.000	0.602	0.573	0.046	0.018
Other C-9's	0.017	0.009	2.861	3.749	0.230	0.121
n-Nonane	0.006	0.003	1.268	1.786	0.101	0.057
Other C10's	0.012	0.007	2.882	4.150	0.227	0.132
n-Decane	0.002	0.001	0.797	1.224	0.062	0.038
Undecanes Plus	0.003	0.002	10.728	19.334	0.806	0.585
<b>TOTAL</b>	<b>100.000</b>	<b>7.701</b>	<b>100.000</b>	<b>100.000</b>	<b>100.000</b>	<b>10.072</b>

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment H - SDS (etc.)**

**Flash Gas Analysis Summary - Design Basis**

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Water	---	H2O	18	0.327	0.0033	0.059	0.191	155.10
Nitrogen	7727-37-9	N2	32.00	0.092	0.00092	0.029	0.095	77.42
Hydrogen Sulfide	2148-87-8	H2S	34.08	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.01	0.204	0.00204	0.090	0.292	236.98
Methane*	75-82-8	CH4	16.04	37.130	0.37130	5.957	19.311	15,696.55
Ethane*	74-84-0	C2H6	30.07	32.298	0.32298	9.712	31.484	25,591.91
Propane**	74-98-6	C3H8	44.10	20.122	0.20122	8.873	28.765	23,381.41
i-Butane**	75-28-5	C4H10	58.12	2.204	0.02204	1.281	4.152	3,375.22
n-Butane**	106-97-8	C4H10	58.12	5.326	0.05326	3.095	10.035	8,157.11
Cyclopentane**	287-92-3	C5H10	70.13	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.15	0.807	0.00807	0.582	1.888	1,534.90
n-Pentane**	109-66-0	C5H12	72.15	0.973	0.00973	0.702	2.276	1,850.12
Cyclohexane**	110-82-7	C6H12	84.16	0.033	0.00033	0.028	0.090	73.00
Other Hexanes**	varies	C6H14	86.18	0.205	0.00205	0.176	0.571	464.53
Methylcyclohexane**	varies	C7H14	98.19	0.019	0.00019	0.019	0.061	49.20
Heptanes**	varies	C7H16	100.20	0.079	0.00079	0.079	0.256	207.79
C8+ Heavies**	varies	C8H18+	130.3 est	0.015	0.00015	0.020	0.065	52.63
Benzene***	71-43-2	C6H6	78.11	0.002	0.00002	0.002	0.006	5.10
Ethylbenzene***	100-41-4	C8H10	106.17	0.001	0.00001	0.001	0.003	2.57
n-Hexane***	110-54-3	C6H14	86.18	0.157	0.00157	0.135	0.439	356.68
Toluene***	108-88-3	C7H8	92.14	0.003	0.00003	0.003	0.009	7.59
2,2,4-TMP (i-Octane)***	540-84-1	C8H18	114.23	0.001	0.00001	0.001	0.004	3.01
Xylenes***	1330-20-7	C8H10	106.17	0.002	0.00002	0.002	0.007	6.06

<b>Totals:</b>	<b>100.000</b>	<b>1.00</b>	<b>30.85</b>	<b>100.00</b>	<b>81,285</b>
<b>Total THC:</b>	<b>99.38</b>	<b>0.99</b>	<b>30.67</b>	<b>99.42</b>	<b>80,815</b>
<b>Total VOC:</b>	<b>29.95</b>	<b>0.30</b>	<b>15.00</b>	<b>48.63</b>	<b>39,527</b>
<b>Total HAP:</b>	<b>0.17</b>	<b>0.002</b>	<b>0.14</b>	<b>0.47</b>	<b>381</b>

\* = Hydrocarbon (HC)

\*\* = also Volatile Organic Compound (VOC)

\*\*\* = also Hazardous Air Pollutant (HAP)

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

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (120% Min)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	0.204	0.292	237	0.259	0.369	300
Methane	75-82-8	CH4	37.130	19.311	15,697	44.708	23.252	18,900
Ethane	74-84-0	C2H6	32.298	31.484	25,592	19.043	17.943	14,115
VOC	Various	C3+	29.949	48.628	39,527	35.990	58.436	47,500
Benzene	71-43-2	C6H6	0.002	0.006	5	0.010	0.025	20
Ethylbenzene	110-54-3	C8H10	0.001	0.003	3	0.007	0.025	20
n-Hexane	100-41-4	C6H14	0.157	0.439	357	0.264	0.738	600
Toluene	108-88-3	C7H8	0.003	0.009	8	0.008	0.025	20
2,2,4-TMP (i-Octane)	540-84-1	C8H18	0.001	0.004	3	0.007	0.025	20
Xylenes	1330-20-7	C8H10	0.002	0.007	6	0.007	0.025	20
Total HAP	Various	C6+	0.167	0.469	381	0.306	0.861	700

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

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

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- **Emissions Unit Table**
-



## ATTACHMENT J

### Emission Points Data Summary Sheet

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

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- **Table 1 – Emissions Data**

- Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)
- Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)
- Startup/Shutdown/Maintenance (Including Blowdown) (SSM-2/24E)
- **Piping and Equipment Fugitives (FUG-3/25E) (MODIFIED)**
- FRANCIS COMPRESSOR STATION (FCS) – FACILITY-WIDE SUMMARY
- OAK GROVE GAS PLANT (OGGP) – FACILITY-WIDE SUMMARY

- **Table 2 – Release Parameter Data**

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Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)**

Table 1: Emissions Data																							
Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )								
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr											
CE-01/22E	Upward Vertical	CE-01/22E	CE-01/22E	01-OxCat	OxCat	C	8,760	NOx	1.52	6.66	1.52	6.66	Gas	Vendor									
								<b>1,380 bhp CAT G3516B (4SLB@1,400 rpm) Compressor Engine 01/22E</b>								CO	8.88	38.91	0.89	3.89	Gas	Vendor	
								VOC	4.29	18.79	1.29	5.64	Gas	Vendor									
								SO2	0.01	0.03	0.01	0.03	Gas	AP-42									
								PM10/2.5	0.11	0.49	0.11	0.49	Liq/Solid	AP-42									
								Acetaldehyde	0.09	0.41	0.03	0.12	Gas	AP-42									
								Acrolein	0.06	0.25	0.02	0.08	Gas	AP-42									
								Benzene	0.01	0.02	1.5E-03	0.01	Gas	AP-42									
								Ethylbenzene	4.5E-04	2.0E-03	1.3E-04	5.9E-04	Gas	AP-42									
								Formaldehyde	1.22	5.33	0.37	1.60	Gas	Vendor									
								n-Hexane	0.01	0.05	0.00	0.02	Gas	AP-42									
								Methanol	0.03	0.12	0.01	0.04	Gas	AP-42									
								Toluene	4.6E-03	0.02	1.4E-03	0.01	Gas	AP-42									
								2,2,4-TMP	2.8E-03	0.01	8.5E-04	3.7E-03	Gas	AP-42									
								Xylenes	2.1E-03	0.01	6.2E-04	2.7E-03	Gas	AP-42									
								Other HAP	0.01	0.05	3.2E-03	0.01	Gas	AP-42									
								Total HAP	1.44	6.29	0.43	1.89	Gas	Sum									
								CO2	1,530	6,703	1,530	6,703	Gas	Vendor									
CH4	7	32	7	32	Gas	Vendor																	
N2O	2.5E-03	0.01	2.5E-03	0.01	Gas	AP-42																	
CO2e	1,713	7,502	1,713	7,502	Gas	Wgt Sum																	

Continued ...



Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
RPC/23E	Varies	RPC/23E	RPC/23E	---	---	C	8,760	NOx	---	---	---	---	Gas	Vendor	
								CO	---	---	---	---	Gas	Vendor	
								VOC	1.32	5.76	1.32	5.76	Gas	Vendor	
								SO2	---	---	---	---	Gas	AP-42	
								PM10/2.5	---	---	---	---	Liq/Solid	AP-42	
								Acetaldehyde	---	---	---	---	Gas	AP-42	
								Acrolein	---	---	---	---	Gas	AP-42	
								Benzene	1.8E-03	0.01	1.8E-03	0.01	Gas	AP-42	
								Ethylbenzene	1.8E-03	0.01	1.8E-03	0.01	Gas	AP-42	
								Formaldehyde	0.01	0.05	0.01	0.05	Gas	Vendor	
								n-Hexane	0.01	0.06	0.01	0.06	Gas	AP-42	
								Methanol	---	---	---	---	Gas	AP-42	
								Toluene	1.8E-03	0.01	1.8E-03	0.01	Gas	AP-42	
								2,2,4-TMP	1.8E-03	0.01	1.8E-03	0.01	Gas	AP-42	
								Xylenes	1.8E-03	0.01	1.8E-03	0.01	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	AP-42	
								Total HAP	0.03	0.15	0.03	0.15	Gas	Sum	
								CO2	13	58	13	58	Gas	Vendor	
CH4	3	12	3	12	Gas	Vendor									
N2O	---	---	---	---	Gas	AP-42									
CO2e	79	347	79	347	Gas	Wgt Sum									

Continued ...

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**Start/Stop/Maintenance (Including Blowdown) (SSM-2/24E)**

Table 1: Emissions Data															
Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
SSM-2/ 24E	Varies	SSM-2/ 24E	SSM-2/ 24E	---	---	Varies	na	NOx	---	---	---	---	Gas	Vendor	
								CO	---	---	---	---	Gas	Vendor	
								VOC	---	16.02	---	16.02	Gas	Vendor	
								SO2	---	---	---	---	Gas	AP-42	
								PM10/2.5	---	---	---	---	Liq/Solid	AP-42	
								Acetaldehyde	---	---	---	---	Gas	AP-42	
								Acrolein	---	---	---	---	Gas	AP-42	
								Benzene	---	0.02	---	0.02	Gas	AP-42	
								Ethylbenzene	---	0.02	---	0.02	Gas	AP-42	
								Formaldehyde	---	---	---	---	Gas	Vendor	
								n-Hexane	---	0.17	---	0.17	Gas	AP-42	
								Methanol	---	---	---	---	Gas	AP-42	
								Toluene	---	0.02	---	0.02	Gas	AP-42	
								2,2,4-TMP	---	0.02	---	0.02	Gas	AP-42	
								Xylenes	---	0.02	---	0.02	Gas	AP-42	
								Other HAP	---	---	---	---	Gas	AP-42	
								Total HAP	---	0.27	---	0.27	Gas	Sum	
								CO2	---	---	---	---	Gas	Vendor	
CH4	---	35	---	35	Gas	Vendor									
N2O	---	---	---	---	Gas	AP-42									
CO2e	---	881	---	881	Gas	Wgt Sum									

Continued ...

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**Piping and Equipment Fugitives - (FUG-3/25E) (MODIFIED)**

Table 1: Emissions Data																						
Emission Point ID No. <i>(Must match Emission Units Table &amp; Plot Plan)</i>	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Air Pollution Control Device <i>(Must match Emission Units Table &amp; Plot Plan)</i>		Vent Time for Emission Unit <i>(Chemical processes only)</i>		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> <i>(Speciate VOCs &amp; HAPS)</i>	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase <i>(At exit conditions, Solid, Liquid or Gas/Vapor)</i>	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> <i>(ppmv or mg/m<sup>3</sup>)</i>							
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr										
FUG-3/25E	Fugitive	FUG-3/25E	FUG-3/25E	LDAR	LDAR	C	8,760	NOx	---	---	---	---	Gas	---								
								CO	---	---	---	---	---	---	---	Gas	---					
								<b>VOC</b>	<b>3.28</b>	<b>14.38</b>	<b>0.53</b>	<b>2.32</b>	---	---	---	---	Gas	EPA				
								SO2	---	---	---	---	---	---	---	---	---	---	Gas	---		
								PM10/2.5	---	---	---	---	---	---	---	---	---	---	Liq/Solid	---		
								Acetaldehyde	---	---	---	---	---	---	---	---	---	---	---	Gas	---	
								Acrolein	---	---	---	---	---	---	---	---	---	---	---	Gas	---	
								<b>Benzene</b>	<b>0.02</b>	<b>0.07</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	---	---	---	---	---	Gas	EE	
								<b>Ethylbenzene</b>	<b>0.02</b>	<b>0.07</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	---	---	---	---	---	Gas	EE	
								Formaldehyde	---	---	---	---	---	---	---	---	---	---	---	Gas	---	
								<b>n-Hexane</b>	<b>0.09</b>	<b>0.41</b>	<b>0.02</b>	<b>0.08</b>	---	---	---	---	---	---	---	Gas	EE	
								Methanol	---	---	---	---	---	---	---	---	---	---	---	Gas	EE	
								<b>Toluene</b>	<b>0.02</b>	<b>0.07</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	---	---	---	---	---	Gas	EE	
								<b>2,2,4-TMP</b>	<b>0.02</b>	<b>0.07</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	---	---	---	---	---	Gas	EE	
								<b>Xylenes</b>	<b>0.02</b>	<b>0.07</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	---	---	---	---	---	Gas	EE	
								Other HAP	---	---	---	---	---	---	---	---	---	---	---	Gas	EE	
								<b>Total HAP</b>	<b>0.18</b>	<b>0.78</b>	<b>0.03</b>	<b>0.15</b>	---	---	---	---	---	---	---	Gas	Sum	
								<b>CO2</b>	<b>0.03</b>	<b>0.1</b>	<b>5E-03</b>	<b>0.02</b>	---	---	---	---	---	---	---	Gas	EE	
								<b>CH4</b>	<b>4</b>	<b>18</b>	<b>1</b>	<b>2</b>	---	---	---	---	---	---	---	Gas	EE	
								N2O	---	---	---	---	---	---	---	---	---	---	---	Gas	---	
<b>CO2e</b>	<b>104</b>	<b>455</b>	<b>14</b>	<b>62</b>	---	---	---	---	---	---	---	Gas	Wgt Sum									

Continued ...

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**FACILITY-WIDE SUMMARY**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )									
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr												
na	na	na	na	na	na	na	na	na	NOx	1.52	6.66	1.52	6.66	Gas	Sum									
									CO	8.88	38.91	0.89	3.89	Gas	Sum									
									<b>FRANCIS COMPRESSOR STATION (FCS) FACILITY-WIDE SUMMARY (Including Fugitives (FUG-3/25E))</b>								VOC - Point	5.61	40.57	2.60	27.42	Gas	Sum	
									VOC - Fug	3.28	14.38	0.53	2.32	Gas	Sum									
									VOC - Total	8.89	54.95	3.13	29.74	Gas	Sum									
									SO2	0.01	0.03	0.01	0.03	Gas	Sum									
									PM10/2.5	0.11	0.49	0.11	0.49	Solid/Gas	Sum									
									Acetaldehyde	0.09	0.41	0.03	0.12	Gas	Sum									
									Acrolein	0.06	0.25	0.02	0.08	Gas	Sum									
									Benzene	0.02	0.12	6.5E-03	0.05	Gas	Sum									
									Ethylbenzene	1.9E-02	0.10	5.2E-03	0.04	Gas	Sum									
									Formaldehyde	1.23	5.38	0.38	1.65	Gas	Sum									
									n-Hexane	0.12	0.70	0.04	0.33	Gas	Sum									
									Methanol	0.03	0.12	0.01	0.04	Gas	Sum									
									Toluene	0.02	0.12	6.4E-03	0.05	Gas	Sum									
									2,2,4-TMP	0.02	0.11	5.9E-03	0.05	Gas	Sum									
									Xylenes	0.02	0.11	5.6E-03	0.04	Gas	Sum									
									Other HAP	0.01	0.05	3.2E-03	0.01	Gas	Sum									
									Total HAP	1.65	7.49	0.50	2.45	Gas	Sum									
									CO2	1,544	6,761	1,544	6,761	Gas	Sum									
CH4	14	97	10	81	Gas	Sum																		
N2O	2E-03	0.01	2E-03	0.01	Gas	Sum																		
CO2e	1,896	9,186	1,806	8,792	Gas	Wgt Sum																		

**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

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

**OAK GROVE GAS PLANT - FACILITY-WIDE SUMMARY**

**Table 1: Emissions Data**

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (Chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration <sup>7</sup> (ppmv or mg/m <sup>3</sup> )								
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr											
na	na	na	na	na	na	na	na	NOx	651.53	132.01	651.53	127.93	Gas	Sum									
								CO	1,295	237.12	1,287	196.55	Gas	Sum									
								<b>OAK GROVE GAS PLANT (OGGP) FACILITY-WIDE SUMMARY (Including Francis CS and Independence CS) (Including Fugitives)</b>								VOC - Point	17,743	2,128	214.96	97.92	Gas	Sum	
								VOC - Fug	31.88	139.61	10.25	44.89	Gas	Sum									
								VOC - Total	17,775	2,267	225.21	142.80	Gas	Sum									
								SO2	1.68	0.79	1.68	0.79	Gas	Sum									
								PM10/2.5	21.55	11.18	21.55	11.18	Solid/Gas	Sum									
								Acetaldehyde	0.03	0.12	0.03	0.12	Gas	Sum									
								Acrolein	0.02	0.08	0.02	0.08	Gas	Sum									
								Benzene	450.05	0.08	5.59	1.97	Gas	Sum									
								Ethylbenzene	0.02	0.08	7.18	2.14	Gas	Sum									
								Formaldehyde	0.02	0.08	0.78	1.77	Gas	Sum									
								n-Hexane	0.02	0.08	7.00	4.09	Gas	Sum									
								Methanol	0.02	0.08	0.01	0.04	Gas	---									
								Toluene	0.02	0.08	6.40	2.06	Gas	Sum									
								2,2,4-TMP	0.02	0.08	7.65	2.20	Gas	Sum									
								Xylenes	0.02	0.08	7.20	2.15	Gas	Sum									
								Other HAP	0.02	0.08	0.03	0.02	Gas	Sum									
								Total HAP	0.02	0.08	41.88	16.64	Gas	Sum									
								CO2	32,717	143,299	51,395	225,108	Gas	Sum									
CH4	713	3,125	129	565	Gas	Sum																	
N2O	0.05	0.24	0.21	0.91	Gas	Sum																	
CO2e	51,114	223,880	54,683	239,513	Gas	Wgt Sum																	

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment J - Emission Points Data Summary Sheet**

**Notes**

Criteria Pollutants	
Pollutant	CAS
NO2	10024-97-2
CO	630-08-0
VOC	varies
Propane	74-98-6
i-Butane	75-28-5
n-Butane	106-97-8
SO2	7446-09-5
PM10/2.5	varies

Hazardous Air Pollutants (HAPs)	
Pollutant	CAS
Acetaldehyde	75-07-0
Acrolein	107-02-8
Benzene	71-43-2
Ethylbenzene	100-41-4
Formaldehyde	50-00-0
n-Hexane	110-54-3
Methanol	67-56-1
Toluene	108-88-3
2,2,4-TMP	540-84-1
Xylenes	1330-20-7

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).

### FRANCIS COMPRESSOR STATION

Application for Class II Administrative Update

### Attachment J - Emission Points Data Summary Sheet

### Release Parameter Data

Table 2: Release Parameter Data

Emission Point ID No. <i>(Must match Emission Units Table)</i>		Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
			Temp. (oF)	Volumetric Flow <sup>1</sup> (acfm) <i>(At operating conditions)</i>	Velocity (fps)	Ground Level <i>(Height above mean sea level)</i>	Stack Height <sup>2</sup> <i>(Release height of emissions above ground level)</i>	Northing	Easting
CE-01	22E	1.0	1,007	9,216	---	1,200	20	4,413.81	526.24
RPC-3	23E	NA	100	---	---	1,200	4	4,413.81	526.24
SSM-2	24E	NA	100	---	---	1,200	4	4,413.81	526.24
FUG-3	25E	NA	100	---	---	1,200	4	4,413.81	526.24

<sup>1</sup> Give at operating conditions. Include inerts.  
<sup>2</sup> Release height of emissions above ground level.

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

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“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**
-



**FRANCIS COMPRESSOR STATION**

Application for Class II Administrative Update

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

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

 Yes  No If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.

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

 Yes  No If Yes, then complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.

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

 Yes  No If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.

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

 Yes  No If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.

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

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment K - Fugitive Emissions**

**Fugitive Emissions Data Summary Sheet - Continued**

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

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

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS <sup>1</sup>	Maximum Potential Pre-Controlled Emissions <sup>2</sup>		Maximum Potential Controlled Emissions <sup>3</sup>		Est. Method Used <sup>4</sup>
		lb/hr	ton/yr	lb/hr	ton/yr	
Paved Haul Roads	na	---	---	---	---	---
Unpaved Haul Roads	na	---	---	---	---	---
Storage Pile Emissions	na	---	---	---	---	---
Loading/Unloading Operations	na	---	---	---	---	---
Wastewater Treatment	na	---	---	---	---	---
Equipment Leaks (FUG-3/25E) (MODIFIED)	<b>VOC</b>	<b>3.28</b>	<b>14.38</b>	<b>0.53</b>	<b>2.32</b>	<b>AP-42</b>
	Acetaldehyde	---	---	---	---	AP-42/MB
	Acrolein	---	---	---	---	AP-42/MB
	Benzene	0.02	0.07	3.2E-03	0.01	AP-42/MB
	Ethylbenzene	0.02	0.07	3.2E-03	0.01	AP-42/MB
	Formaldehyde	---	---	---	---	AP-42/MB
	n-Hexane	0.09	0.41	0.02	0.08	AP-42/MB
	Methanol	---	---	---	---	AP-42/MB
	Toluene	0.02	0.07	3.2E-03	0.01	AP-42/MB
	2,2,4-TMP	0.02	0.07	3.2E-03	0.01	AP-42/MB
	Xylenes	0.02	0.07	3.2E-03	0.01	AP-42/MB
	Other HAP	---	---	---	---	AP-42/MB
	<b>Total HAP</b>	<b>0.18</b>	<b>0.78</b>	<b>0.03</b>	<b>0.15</b>	<b>SUM</b>
	CO2	0.03	0.1	5E-03	0.02	AP-42
	CH4	4	18	1	2	AP-42
	N2O	---	---	---	---	---
<b>CO2e</b>	<b>104</b>	<b>455</b>	<b>14</b>	<b>62</b>	<b>Wgt Sum</b>	
General Clean-up - VOC Emissions	na	---	---	---	---	---
Other	na	---	---	---	---	---

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

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

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

<sup>4</sup> Indicate method used to determine emission rate as follows:

MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment K - Fugitive Emissions**

**Fugitive Emissions Data Summary Sheet - Continued**

<b>LEAK SOURCE DATA SHEET</b>						
Soure Category	Pollutant	Number of Source Components <sup>1</sup>	Number of Components Monitored by Frequency <sup>2</sup>	Average Time to Repair (Days) <sup>3</sup>	Estimated Annual Emission Rate (lb/yr) <sup>4</sup>	
<b>Pumps<sup>5</sup></b>	Light Liquid VOC <sup>6,7</sup>					
	Heavy Liquid VOC <sup>8</sup>					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Valves<sup>10</sup></b>	Gas VOC					
	Light Liquid VOC					
	Heavy Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Safety Relief Valves<sup>11</sup></b>	Gas VOC					
	Light Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Open Ended Lines<sup>12</sup></b>	Gas VOC					
	Light Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Sampling Connections<sup>13</sup></b>	Gas VOC					
	Light Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Compressors</b>	Gas VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Flanges</b>	Gas VOC					
	Light Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
<b>Other (Connectors)</b>	Gas VOC					
	Light Liquid VOC					
	Non-VOC <sup>9</sup> (Water/Oil)					
					<b>TOTAL (lb/yr)</b>	<b>4,490</b>
					<b>TOTAL (tpy)</b>	<b>2.25</b>

**FUG-3 (25E)**

**Please Reference:**  
**Attachment J - Process Piping Fugitive Emissions**  
**Attachment K - Fugitive Emissions Summary Data Sheet**  
**and**  
**Attachment N - Process Piping Fugitive Emissions**

**Attachment K**  
**FUGITIVE EMISSIONS DATA SUMMARY SHEET - Continued**

**Notes for Leak Source Data Sheet**

1. For VOC sources include components on streams and equipment that contain greater than 10% VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in visual or soap-bubble leak detection ppm. Do not include monitoring by methods. "M/Q(M)/Q/SA/A/0" means the time period between inspections as follows:  
Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/other (specify time period)

If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category valves, gas service: 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); 0 - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count seal-less pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR. 51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C. then the fluid is defined as a heavy liquid.

9. LIST CO, H<sub>2</sub>S, mineral acids, NO, NO<sub>2</sub>, SO<sub>2</sub>, etc. DO NOT LIST CO, H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

**ATTACHMENT L**  
**Emissions Unit Data Sheet(s)**

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

---

- **NATURAL GAS COMPRESSOR/GENERATOR ENGINE (CE-01/22E)**
    - 1,380 BHP CAT G3516B ENGINE - VENDOR DATA
  
  - **ELECTRIC MOTOR DRIVEN COMPRESSOR (RPC-3/23E)**
    - LEROI LRG9-DP - VENDOR DATA
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment L - Emission Unit Data Sheet**

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

Facility		Francis					
Source Identification Number <sup>1</sup>		CE-01/22E					
Engine Manufacturer and Model		CAT G3516B					
Manufacturer's Rated bhp/rpm		1,380 / 1,400					
Source Status <sup>2</sup>		NS					
Date Installed/Modified/Removed <sup>3</sup>		TBD					
Manufactured/Reconstruction Date <sup>4</sup>		After 06/12/06					
Certified Engine (40CFR60 NSPS JJJJ) <sup>5</sup>		No					
Engine, Fuel and Combustion Data	Engine Type <sup>6</sup>	LB4S					
	APCD Type <sup>7</sup>	OXCAT					
	Fuel Type <sup>8</sup>	RG					
	H <sub>2</sub> S (gr/100 scf)	0.2					
	Operating bhp/rpm	1,380 / 1,400					
	BSFC (Btu/bhp-hr)	8,182					
	Fuel (ft <sup>3</sup> /hr)	11,070					
	Fuel (MMft <sup>3</sup> /yr)	96.97					
	Operation (hrs/yr)	8,760					
Reference <sup>9</sup>	PTE <sup>10</sup>	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NOx	1.52	6.66				
MD	CO	0.89	3.89				
MD	VOC	1.29	5.64				
AP	SO <sub>2</sub>	0.01	0.03				
AP	PM <sub>10/2.5</sub>	0.11	0.49				
MD	HCHO	0.37	1.60				
MD/AP	Total HAP	0.43	1.89				
MD/40CFR98	CO <sub>2e</sub>	1,713	7,502				

<b>ENGINE SPEED (rpm):</b>	<b>1400</b>
COMPRESSION RATIO:	8
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	201
JACKET WATER OUTLET (°F):	210
ASPIRATION:	TA
COOLING SYSTEM:	JW+OC+1AC, 2AC
CONTROL SYSTEM:	ADEM3
EXHAUST MANIFOLD:	DRY
COMBUSTION:	LOW EMISSION
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5
SET POINT TIMING:	28

RATING STRATEGY:	STANDARD
RATING LEVEL:	CONTINUOUS
FUEL SYSTEM:	CAT WIDE RANGE
	WITH AIR FUEL RATIO CONTROL
<b>SITE CONDITIONS:</b>	
FUEL:	Gas Analysis
FUEL PRESSURE RANGE(psig):	7.0-40.0
FUEL METHANE NUMBER:	57.3
FUEL LHV (Btu/scf):	1181
ALTITUDE(ft):	1500
MAXIMUM INLET AIR TEMPERATURE(°F):	100
STANDARD RATED POWER:	1380 bhp@1400rpm

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

ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	7425	7425	7953	8542
<b>FUEL CONSUMPTION (HHV)</b>		(2)	<b>Btu/bhp-hr</b>	<b>8182</b>	8182	8763	9412
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft <sup>3</sup> /min	3284	3284	2576	1801
AIR FLOW	(WET)	(3)(4)	lb/hr	13962	13962	10953	7657
FUEL FLOW (60°F, 14.7 psia)			scfm	145	145	116	83
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	93.3	93.3	75.7	53.2
<b>EXHAUST TEMPERATURE - ENGINE OUTLET</b>		(6)	<b>°F</b>	<b>1007</b>	1007	1000	1020
<b>EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)</b>	(WET)	(7)(4)	<b>ft<sup>3</sup>/min</b>	<b>9216</b>	9216	7207	5113
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	14454	14454	11348	7940

EMISSIONS DATA - ENGINE OUT							
<b>NOx (as NO2)</b>		(8)(9)	<b>g/bhp-hr</b>	<b>0.50</b>	0.50	0.50	0.50
<b>CO</b>		(8)(9)	<b>g/bhp-hr</b>	<b>2.92</b>	2.92	3.13	3.08
<b>THC (mol. wt. of 15.84)</b>		(8)(9)	<b>g/bhp-hr</b>	<b>4.53</b>	4.53	4.86	4.93
<b>NMHC (mol. wt. of 15.84)</b>		(8)(9)	<b>g/bhp-hr</b>	<b>2.14</b>	2.14	2.29	2.32
<b>NMNEHC (VOCs) (mol. wt. of 15.84)</b>		(8)(9)(10)	<b>g/bhp-hr</b>	<b>1.01</b>	1.01	1.08	1.10
<b>HCHO (Formaldehyde)</b>		(8)(9)	<b>g/bhp-hr</b>	<b>0.40</b>	0.40	0.39	0.39
<b>CO2</b>		(8)(9)	<b>g/bhp-hr</b>	<b>503</b>	503	537	584
EXHAUST OXYGEN		(8)(11)	% DRY	9.1	9.1	8.8	8.4

HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	22309	22309	20744	19351
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	4475	4475	3978	3363
HEAT REJ. TO A/C - STAGE 1 (1AC)		(12)(13)	Btu/min	12348	12348	10260	3630
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	5637	5637	5297	3438

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	42875
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5919
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

**CONDITIONS AND DEFINITIONS**

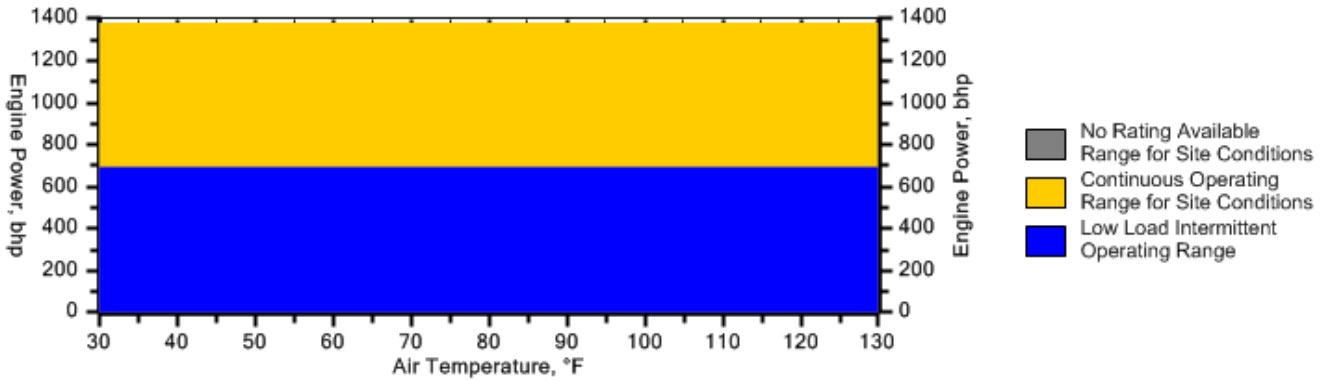
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.



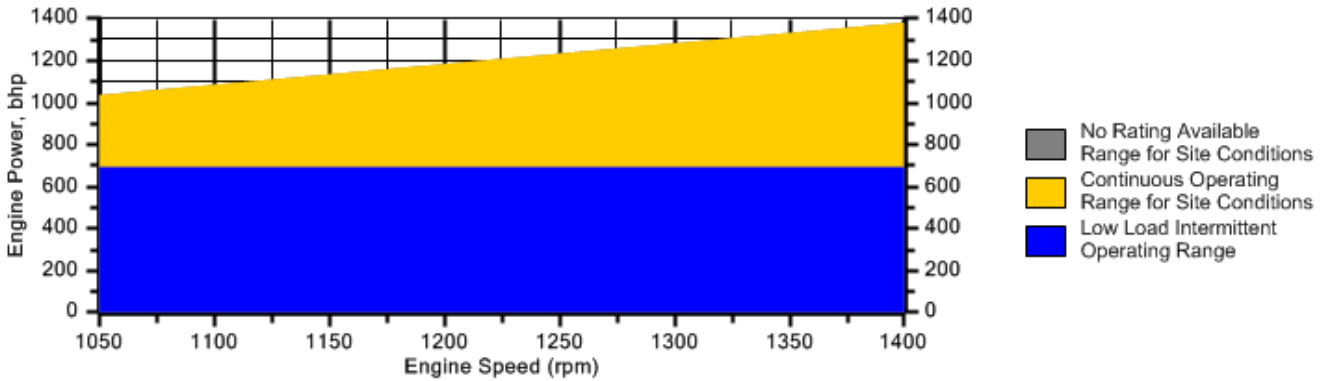
**Engine Power vs. Inlet Air Temperature**

Data represents temperature sweep at 1500 ft and 1400 rpm



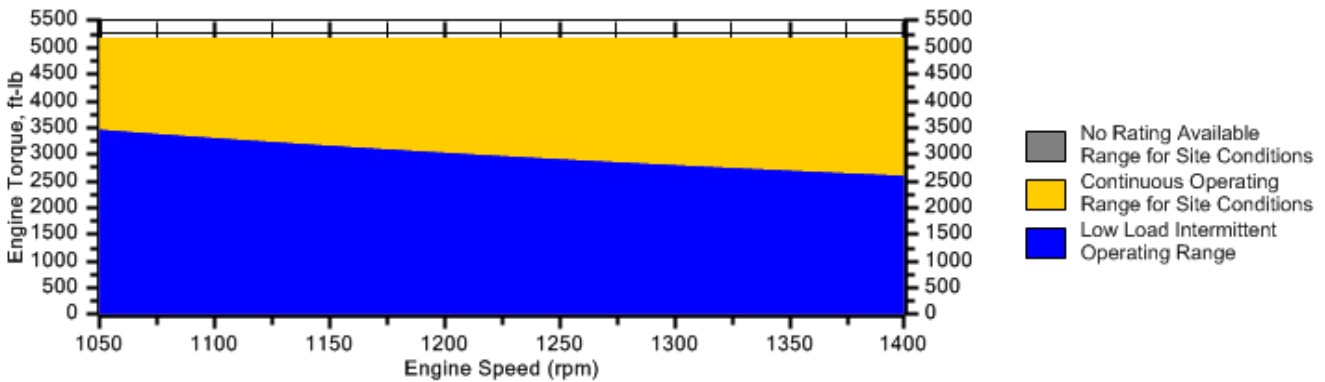
**Engine Power vs. Engine Speed**

Data represents speed sweep at 1500 ft and 100 °F



**Engine Torque vs. Engine Speed**

Data represents speed sweep at 1500 ft and 100 °F



Note: At site conditions of 1500 ft and 100°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

**NOTES**

1. Engine rating is with two engine driven water pumps. Tolerance is  $\pm 3\%$  of full load.
2. Fuel consumption tolerance is  $\pm 3.0\%$  of full load data.
3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of  $\pm 5\%$ .
4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
5. Inlet manifold pressure is a nominal value with a tolerance of  $\pm 5\%$ .
6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of  $\pm 6\%$ .
8. Emissions data is at engine exhaust flange prior to any after treatment.
9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than  $\pm 3$ . Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.
10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is  $\pm 0.5$ .
12. Heat rejection values are nominal. Tolerances, based on treated water, are  $\pm 10\%$  for jacket water circuit,  $\pm 50\%$  for radiation,  $\pm 20\%$  for lube oil circuit, and  $\pm 5\%$  for aftercooler circuit.
13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.
14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.1010	0.1011
Methane	CH4	72.9370	73.0283
Ethane	C2H6	17.1740	17.1955
Propane	C3H8	6.2900	6.2979
Isobutane	iso-C4H10	0.6170	0.6178
Norbutane	nor-C4H10	1.4920	1.4939
Isopentane	iso-C5H12	0.2500	0.2503
Norpentane	nor-C5H12	0.3110	0.3114
Hexane	C6H14	0.0610	0.0611
Heptane	C7H16	0.0170	0.0170
Nitrogen	N2	0.4630	0.4636
Carbon Dioxide	CO2	0.1570	0.1572
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0040	0.0040
Nonane	C9H20	0.0010	0.0010
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		99.8750	100.0000

Fuel Makeup: Gas Analysis  
Unit of Measure: English

**Calculated Fuel Properties**

Caterpillar Methane Number:	57.3
Lower Heating Value (Btu/scf):	1181
Higher Heating Value (Btu/scf):	1301
WOBBE Index (Btu/scf):	1367
THC: Free Inert Ratio:	159.92
Total % Inerts (% N2, CO2, He):	0.62%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.996
Stoich A/F Ratio (Vol/Vol):	12.23
Stoich A/F Ratio (Mass/Mass):	16.41
Specific Gravity (Relative to Air):	0.745
Specific Heat Constant (K):	1.275

**CONDITIONS AND DEFINITIONS**

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

**FUEL LIQUIDS**

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

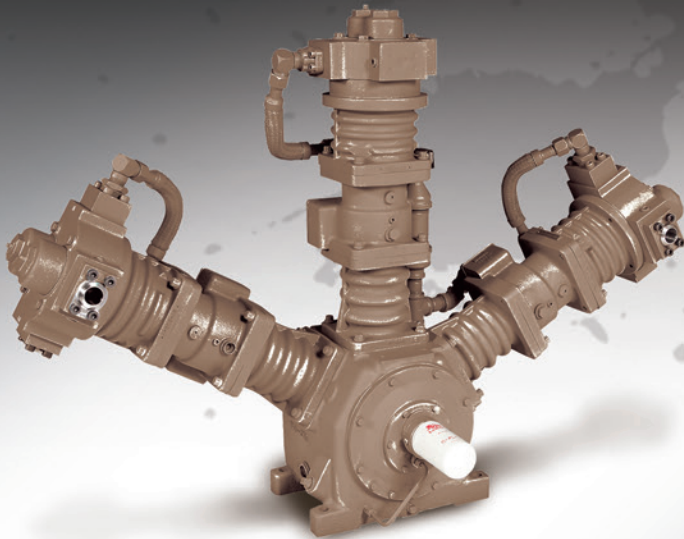


# LeROI® Gas Compressors

by Rotary Compression Technologies, Inc.

211 East Russell Rd  
Sidney, OH 45365  
ph: +1 (937) 498-2555

## LRG9-DP Series Reciprocating Compressor



### PERFORMANCE

- Brake HP 55 Max.
- Flow (MSCFD) 1000 Max @ STD Inlet Conditions
- Inlet Pressure Vacuum to 1200 PSIG Max
- Discharge Pressures 1500 PSIG MAOP
- Speed Range 560-1200 RPM's
- Rod Loads 6000 lbs. Max
- Rotation CW or CCW
- Frame Lubrication Pump with Spin-on Filter
- Cylinders Non lubricated
- Suction Valve un-loaders available upon request.

### BENEFITS

The LeROI LRG9-DP non-lubricated reciprocating compressors are very cost-effective for handling gas in field gathering, vapor recovery, gas to pipeline sales to 1500 PSIG and other applications. The LRG9-DP compressor comes with a true distance piece and packing case with a 3-seal design standard. The compressor is available in a 35 and 55 horsepower frame with non-lubricated cylinders.

The LeROI LRG9 doesn't restrict you to fixed cylinder configurations. We offer 12 cylinder sizes from 1.50" to 8.50" for unmatched flexibility in a belt-driven compressor.

### FEATURES

The LRG9-DP can be configured as a single stage compressor with 1, 2, or 3 cylinders, 2-stage compressor with 2 or 3 cylinders and a 3-stage with 3-cylinders. There are two standard packing case designs available Vac-100 PSIG cylinder flange suction pressure and a 50 to 800 PSIG cylinder flange suction pressure. The valves and piston rings are Hoerbiger designs. The piston rings are a two-piece design and the valves are non-metallic and tailored to optimize valve life and performance based on customer supplied conditions. The cylinder heads include two 1/2" FNPT ports for temperature and or pressure measurements. The cylinder heads include two discharge ports and are reversible for packaging flexibility. The compressor can be configured for future cylinder additions or fixed reduce cylinder number designs. The LRG9-DP is non-lubricated and ideal for wet gas streams and eliminates the need for a crankcase oil make-up system. The lube oil system comes with a spin-on filter and doesn't require additional cooling.



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Email [sales@leroigas.com](mailto:sales@leroigas.com)

LeROI Gas Compressors policy is one of continuous improvement and we therefore reserve the right to alter specifications and prices without prior notice. All products are sold subject to the Company's conditions of sale.



LeROI is an ISO 9001:2000 registered company

**ATTACHMENT M**  
**Air Pollution Control Device Sheet(s)**

---

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

---

- **OXIDATION CATALYST (1-OXCAT) FOR COMPRESSOR ENGINE CE-01/22E**
    - OXIDATION CATALYST - VENDOR DATA
-

**FRANCIS COMPRESSOR STATION**

Application for Class II Administrative Update

**Attachment M - Air Pollution Control Device Sheet**

**Control Device ID No. (must match Emission Units Table):**

**1-OXCAT**

**Equipment Information**

1. Manufacturer: <b>Catalytic Combustion Corporation</b>	2. Control Device Name: <b>OXIDATION CATALYST (1-OXCAT)</b>
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: <div style="display: flex; justify-content: space-around; text-align: center;"> <span><b>CO    90%</b></span> <span><b>NMNEHC    70%</b></span> <span><b>HCHO    70%</b></span> </div>	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: <b>9,216 SCFM</b>	10. Capacity: <b>NA</b>
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. <b>NA</b>	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse or disposal. <b>NA</b>	

**Gas Stream Characteristics**

14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are particulates present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
15. Inlet emission stream parameters:	Maximum	Typical
Pressure (mmHg):	<b>NA</b>	<b>NA</b>
Heat Content (BTU/scf):	<b>NA</b>	<b>NA</b>
Oxygen Content (%):	<b>NA</b>	<b>NA</b>
Moisture Content (%):	<b>NA</b>	<b>NA</b>
Relative Humidity (%):	<b>NA</b>	<b>NA</b>





**FRANCIS COMPRESSOR STATION**

Application for Class II Administrative Update

**Attachment M - Air Pollution Control Device Sheet - Continued**

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): <b>NA</b>	
28. Describe the collection material disposal system: <b>NA</b>	
29. Describe the collection material disposal system: <span style="float: right;"><b>NA</b></span>	
30. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING:	RECORDKEEPING:
REPORTING:	TESTING:
MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING	Please describe any proposed emissions testing for this process equipment on air pollution control device.
31. Manufacturer's Guaranteed <u>Collection</u> Efficiency for each air pollutant.	
<b>CO</b>	<b>~100%</b>
<b>NMNEHC</b>	<b>~100%</b>
<b>HCHO</b>	<b>~100%</b>
32. Manufacturer's Guaranteed <u>Control</u> Efficiency for each air pollutant.	
<b>CO</b>	<b>≥90%</b>
<b>NMNEHC</b>	<b>≥70%</b>
<b>HCHO</b>	<b>≥70%</b>
33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	

To Williams  
 Attn  
 Via E-mail

Our Ref. QT-115-2264-1  
 Date : 12/7/2015  
 Page: 1 of 1

PERFORMANCE EXPECTATION

For: \_\_\_\_\_ Location: Francis 1,2,3

**Engine Operating Parameters and Catalyst Description**

Engine Manufacturer	Caterpillar	Substrate Type	Folded Metal Foil
Engine Model	G3516B	Cell Pattern	320 cpsi Herringbone
Horsepower	1380 bhp	Banding	CCC C-Channel Design
Speed	1400 rpm	Catalyst Dimensions	23.875 x 14.875 x 3.50"
Exhaust Flowrate	9,216 acfm	Quantity Required	3 per Unit
Exhaust Temperature	1007 °F	Formulation	HFX4
Fuel	Field Gas		

**Engine Output, Fresh Catalyst Performance Expectation and Warranted Emissions**

	Raw Exhaust	Performance	Performance
NOx	0.5 g/bhp-hr		
CO	2.92 g/bhp-hr	90 % Conversion	0.29 g/bhp-hr
THC	4.53 g/bhp-hr		
NMNEHC	1.01 g/bhp-hr	70 % Conversion	0.30 g/bhp-hr
HCHO	0.4 g/bhp-hr	70 % Conversion	0.12 g/bhp-hr
Oxygen	9.1 %		

\* Per user supplied information

**Notes and Cautions**

Note: Catalyst performance is dependent upon the engine being run in accordance with the manufacturer's specifications for new engines.

**Issued by**

Name : Brian Weninger \_\_\_\_\_

Date : 12/7/15 \_\_\_\_\_

# ATTACHMENT N

## Supporting Emissions Calculations

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

---

- **Emission Summary Spreadsheets**
    - **Potential to Emit (PTE) – CRITERIA – CONTROLLED**
    - Potential to Emit (PTE) – CRITERIA – PRE-CONTROLLED
    - **Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – CONTROLLED**
    - Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – PRE-CONTROLLED
    - Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – CONTROLLED
    - Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – PRE-CONTROLLED
  - **Unit-Specific Emission Spreadsheets**
    - Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)
    - Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)
    - Start/Stop/Maintenance (Including Blowdown) (SSM-2/24E)
  - **Fugitive Emissions**
    - **Process Piping Fugitive Emissions (FUG-3/25E) (MODIFIED VOC and HAP) – 01/02**
    - **Process Piping Fugitive Emissions (FUG-3/25E) (MODIFIED VOC and HAP) – 02/02**
  - **AP-42 and GHG Emission Factors**
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – CRITERIA – CONTROLLED**

Unit ID	Point ID	Description	Site Rating	NOX		CO		VOC		SO2		PM10/2.5	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	22E	CAT G3516B Compressor Engine (OxCat)	1,380 bhp	1.52	6.66	0.89	3.89	1.29	5.64	0.01	0.03	0.11	0.49
RPC-3	23E	Rod Packing/Crankcase Leaks	2 Recip	---	---	---	---	1.32	5.76	---	---	---	---
SSM-2	24E	Start/Stop/Maintenance (i.e., Blowdown)	2 Recip	---	---	---	---	---	16.02	---	---	---	---
<b>POINT SOURCE SUBTOTAL - FRANCIS CS:</b>				<b>1.52</b>	<b>6.66</b>	<b>0.89</b>	<b>3.89</b>	<b>2.60</b>	<b>27.42</b>	<b>0.01</b>	<b>0.03</b>	<b>0.11</b>	<b>0.49</b>

POINT SOURCE SUBTOTAL - OAK GROVE GP:	650.01	121.26	1,286.38	192.66	212.13	69.50	1.67	0.76	21.43	10.68
POINT SOURCE SUBTOTAL - INDEPENDENCE CS:	---	---	---	---	0.23	1.00	---	---	---	---
<b>TOTAL - POINT SOURCE EMISSIONS:</b>	<b>651.53</b>	<b>127.93</b>	<b>1,287.27</b>	<b>196.55</b>	<b>214.96</b>	<b>97.92</b>	<b>1.68</b>	<b>0.79</b>	<b>21.55</b>	<b>11.18</b>
<b>PSD THRESHOLD:</b>	250 tpy		250 tpy		250 tpy		250 tpy		250 tpy	

FUG-3-G	25E	Piping and Equipment Fugitives - Gas	---	---	---	---	0.24	1.03	---	---	---	---
FUG-3-L		Piping and Equipment Fugitives - Liquid	---	---	---	---	0.22	0.98	---	---	---	---
FUG-3-M		Piping and Equipment Fugitives - Mixture	---	---	---	---	0.07	0.30	---	---	---	---
<b>FUGITIVE SOURCE SUBTOTAL - FRANCIS CS:</b>				<b>---</b>	<b>---</b>	<b>---</b>	<b>0.53</b>	<b>2.32</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

FUGITIVE SOURCE SUBTOTAL - OAK GROVE GP:	---	---	---	---	9.70	42.50	---	---	---	---
FUGITIVE SOURCE SUBTOTAL - INDEPENDENCE CS:	---	---	---	---	0.01	0.06	---	---	---	---
<b>TOTAL - FUGITIVE EMISSIONS:</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>10.25</b>	<b>44.89</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

<b>GRAND TOTAL - FRANCIS CS:</b>	<b>1.52</b>	<b>6.66</b>	<b>0.89</b>	<b>3.89</b>	<b>3.13</b>	<b>29.74</b>	<b>0.01</b>	<b>0.03</b>	<b>0.11</b>	<b>0.49</b>
GRAND TOTAL - OAK GROVE GP:	650.01	121.26	1,286.38	192.66	221.84	112.00	1.67	0.76	21.43	10.68
GRAND TOTAL - INDEPENDENCE CS:	---	---	---	---	0.24	1.06	---	---	---	---
<b>GRAND TOTAL - PLANT-WIDE EMISSIONS:</b>	<b>651.53</b>	<b>127.93</b>	<b>1,287.27</b>	<b>196.55</b>	<b>225.21</b>	<b>142.80</b>	<b>1.68</b>	<b>0.79</b>	<b>21.55</b>	<b>11.18</b>
<b>WV NSR THRESHOLD:</b>	6 lb/hr AND 10 tpy		6 lb/hr AND 10 tpy		6 lb/hr AND 10 tpy		6 lb/hr AND 10 tpy		6 lb/hr AND 10 tpy	
<b>TVOP THRESHOLD:</b>	100 tpy		100 tpy		100 tpy		100 tpy		100 tpy	

- Notes:
- 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr; except.
    - a - Start/Stop/Maintenance (SSM-2/24E) is intermittent and 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 - Intermittent Flare Operations distorts the lb/hr emission calculations from the OGGP.

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – CONTROLLED**

Unit ID	Acetaldehyde		Acrolein		Benzene		Ethylbenzene		Formaldehyde		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	lb/hr	tpy	lb/hr	tpy
CE-01	0.03	0.12	0.02	0.08	1.5E-03	0.01	1.3E-04	5.9E-04	0.37	1.60	3.8E-03	0.02	0.01	0.04	1.4E-03	0.01	8.5E-04	3.7E-03	6.2E-04	2.7E-03	3.2E-03	0.01	<b>0.43</b>	<b>1.89</b>
RPC-3	---	---	---	---	1.8E-03	0.01	1.8E-03	0.01	0.01	0.05	0.01	0.06	---	---	1.8E-03	0.01	1.8E-03	0.01	1.8E-03	0.01	---	---	<b>0.03</b>	<b>0.15</b>
SSM-2	---	---	---	---	---	1.9E-02	---	1.9E-02	---	---	---	0.17	---	---	---	0.02	---	0.02	---	0.02	---	---	---	<b>0.27</b>
<b>FCS:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>3.3E-03</b>	<b>0.03</b>	<b>1.9E-03</b>	<b>0.03</b>	<b>0.38</b>	<b>1.65</b>	<b>0.02</b>	<b>0.25</b>	<b>0.01</b>	<b>0.04</b>	<b>3.2E-03</b>	<b>0.03</b>	<b>2.6E-03</b>	<b>0.03</b>	<b>2.4E-03</b>	<b>0.03</b>	<b>3.2E-03</b>	<b>0.01</b>	<b>0.46</b>	<b>2.31</b>
OGGP:	---	---	---	---	5.54	1.76	7.14	1.94	0.40	0.12	6.93	3.60	---	---	6.35	1.86	7.61	2.00	7.16	1.95	0.03	0.01	41.17	13.23
ICS:	---	---	---	---	0.01	0.06	0.01	0.06	---	---	0.01	0.06	---	---	0.01	0.06	0.01	0.06	0.01	0.06	---	---	0.08	0.33
<b>PS-TOT:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>5.56</b>	<b>1.85</b>	<b>7.16</b>	<b>2.03</b>	<b>0.78</b>	<b>1.77</b>	<b>6.96</b>	<b>3.91</b>	<b>0.01</b>	<b>0.04</b>	<b>6.37</b>	<b>1.94</b>	<b>7.62</b>	<b>2.08</b>	<b>7.18</b>	<b>2.03</b>	<b>0.03</b>	<b>0.02</b>	<b>41.71</b>	<b>15.87</b>
PSD:	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
FUG-3-G	---	---	---	---	2.9E-04	1.3E-03	2.9E-04	1.3E-03	---	---	2.6E-03	0.01	---	---	2.9E-04	1.3E-03	2.9E-04	1.3E-03	2.9E-04	1.3E-03	---	---	<b>0.00</b>	<b>0.02</b>
FUG-3-L	---	---	---	---	2.2E-03	0.01	2.2E-03	0.01	---	---	0.01	0.05	---	---	2.2E-03	0.01	2.2E-03	0.01	2.2E-03	0.01	---	---	<b>0.02</b>	<b>0.10</b>
FUG-3-M	---	---	---	---	6.9E-04	3.0E-03	6.9E-04	3.0E-03	---	---	0.00	0.02	---	---	6.9E-04	3.0E-03	6.9E-04	3.0E-03	6.9E-04	3.0E-03	---	---	<b>0.01</b>	<b>0.03</b>
<b>FCS:</b>	---	---	---	---	<b>3.2E-03</b>	<b>0.01</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	<b>0.02</b>	<b>0.08</b>	---	---	<b>3.2E-03</b>	<b>0.01</b>	<b>3.2E-03</b>	<b>0.01</b>	<b>3.2E-03</b>	<b>0.01</b>	---	---	<b>0.03</b>	<b>0.15</b>
OGGP:	---	---	---	---	0.02	0.10	0.02	0.10	---	---	0.02	0.10	---	---	0.02	0.10	0.02	0.10	0.02	0.10	---	---	0.14	0.60
ICS:	---	---	---	---	8.1E-04	3.5E-03	8.1E-04	3.5E-03	---	---	8.1E-04	3.5E-03	---	---	8.1E-04	3.5E-03	8.1E-04	3.5E-03	8.1E-04	3.5E-03	---	---	4.9E-03	0.02
<b>FUG-TOT:</b>	---	---	---	---	<b>0.03</b>	<b>0.12</b>	<b>0.03</b>	<b>0.12</b>	---	---	<b>0.04</b>	<b>0.18</b>	---	---	<b>0.03</b>	<b>0.12</b>	<b>0.03</b>	<b>0.12</b>	<b>0.03</b>	<b>0.12</b>	---	---	<b>0.18</b>	<b>0.77</b>
<b>FCS:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>0.01</b>	<b>0.05</b>	<b>0.01</b>	<b>0.04</b>	<b>0.38</b>	<b>1.65</b>	<b>0.04</b>	<b>0.33</b>	<b>0.01</b>	<b>0.04</b>	<b>0.01</b>	<b>0.05</b>	<b>0.01</b>	<b>0.05</b>	<b>0.01</b>	<b>0.04</b>	<b>3.2E-03</b>	<b>0.01</b>	<b>0.50</b>	<b>2.45</b>
OGGP:	---	---	---	---	5.57	1.86	7.17	2.04	0.40	0.12	6.95	3.70	---	---	6.38	1.96	7.63	2.10	7.19	2.05	0.03	0.01	41.30	13.83
ICS:	---	---	---	---	0.01	0.06	0.01	0.06	---	---	0.01	0.06	---	---	0.01	0.06	0.01	0.06	0.01	0.06	---	---	0.08	0.35
<b>TOTAL:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>5.59</b>	<b>1.97</b>	<b>7.18</b>	<b>2.14</b>	<b>0.78</b>	<b>1.77</b>	<b>7.00</b>	<b>4.09</b>	<b>0.01</b>	<b>0.04</b>	<b>6.40</b>	<b>2.06</b>	<b>7.65</b>	<b>2.20</b>	<b>7.20</b>	<b>2.15</b>	<b>0.03</b>	<b>0.02</b>	<b>41.88</b>	<b>16.64</b>
<b>NSR:</b>	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> 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	
TVOP:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	25

**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – CONTROLLED**

Unit ID	Point ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 53.06		kg/MMBtu: 1.00E-03		kg/MMBtu: 1.00E-04		TOTAL CO2e tpy
					GWP: 1	CO2 CO2e tpy	GWP: 25	CH4 CO2e tpy	GWP: 298	N2O CO2e tpy	
CE-01	22E	CAT G3516B Compressor Engine (OxCat)	11.29	8,760	6,703	6,703	32	796	0.01	3	7,502
RPC-3	23E	Rod Packing/Crankcase Leaks	---	8,760	58	58	12	289	---	---	347
SSM-2	24E	Start/Stop/Maintenance (i.e., Blowdown)	---	---	---	---	35	881	---	---	881
<b>POINT SOURCE SUBTOTAL - FRANCIS CS:</b>					<b>6,761</b>	<b>6,761</b>	<b>79</b>	<b>1,966</b>	<b>0.01</b>	<b>3</b>	<b>8,731</b>

8,731

POINT SOURCE SUBTOTAL - OAK GROVE GP:  
 POINT SOURCE SUBTOTAL - INDEPENDENCE CS:  
**TOTAL - POINT SOURCE EMISSIONS:**

218,331	218,331	147	3,676	1	268	222,275
16	16	262	6,561	---	---	6,577
<b>225,108</b>	<b>225,108</b>	<b>488</b>	<b>12,204</b>	<b>1</b>	<b>272</b>	<b>237,583</b>

237,583

Unit ID	Point ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 0.02	kg/MMBtu: 0.02	kg/MMBtu: 2	kg/MMBtu: 57	kg/MMBtu: ---	kg/MMBtu: ---	TOTAL CO2e tpy
FUG-3-G	25E	Piping and Equipment Fugitives - Gas	---	8,760	0.02	0.02	2	57	---	---	57
FUG-3-L		Piping and Equipment Fugitives - Liquid	---	8,760	---	---	---	---	---	---	---
FUG-3-M		Piping and Equipment Fugitives - Mixture	---	8,760	2E-03	2E-03	0.2	5	---	---	5
<b>FUGITIVE SOURCE SUBTOTAL - FRANCIS CS:</b>					<b>0.02</b>	<b>0.02</b>	<b>2</b>	<b>62</b>	<b>---</b>	<b>---</b>	<b>62</b>

62

FUGITIVE SOURCE SUBTOTAL - OAK GROVE GP:  
 FUGITIVE SOURCE SUBTOTAL - INDEPENDENCE CS:  
**TOTAL - FUGITIVE EMISSIONS:**

0.4	0.2	45	1,118	---	---	1,118
0.2	0.2	30	750	---	---	750
<b>0.6</b>	<b>0.4</b>	<b>77</b>	<b>1,930</b>	<b>---</b>	<b>---</b>	<b>1,930</b>

1,930

**GRAND TOTAL - FRANCIS CS:**  
 GRAND TOTAL - OAK GROVE GP:  
 GRAND TOTAL - INDEPENDENCE CS:  
**GRAND TOTAL - PLANT-WIDE EMISSIONS:**

<b>6,761</b>	<b>6,761</b>	<b>81</b>	<b>2,028</b>	<b>0.01</b>	<b>3</b>	<b>8,792</b>
218,331	218,331	192	4,794	1	268	223,393
16	16	292	7,311	---	---	7,327
<b>225,108</b>	<b>225,108</b>	<b>565</b>	<b>14,133</b>	<b>1</b>	<b>272</b>	<b>239,513</b>

TVOP THRESHOLD:

na	OR	na	OR	na	AND	100,000
na		na		na		na

PSD THRESHOLD:

Notes: 1 - PSD Thresholds and Title V Major Source Thresholds are only applicable if other regulated air pollutants exceed the corresponding Thresholds.

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – CRITERIA – PRE-CONTROLLED**

Unit ID	Point ID	Description	Site Rating	NOX		CO		VOC		SO2		PM10/2.5	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-01	22E	CAT G3516B Compressor Engine (OxCat)	1,380 bhp	1.52	6.66	8.88	38.91	4.29	18.79	0.01	0.03	0.11	0.49
RPC-3	23E	Rod Packing/Crankcase Leaks	2 Recip	---	---	---	---	1.32	5.76	---	---	---	---
SSM-2	24E	Start/Stop/Maintenance (i.e., Blowdown)	2 Recip	---	---	---	---	---	16.02	---	---	---	---
<b>POINT SOURCE SUBTOTAL - FRANCIS CS:</b>				<b>1.52</b>	<b>6.66</b>	<b>8.88</b>	<b>38.91</b>	<b>5.61</b>	<b>40.57</b>	<b>0.01</b>	<b>0.03</b>	<b>0.11</b>	<b>0.49</b>

POINT SOURCE SUBTOTAL - OAK GROVE GP:	650	125	1,286	198	17,738	2,087	1.67	0.76	21.43	10.68
POINT SOURCE SUBTOTAL - INDEPENDENCE CS:	---	---	---	---	0.06	0.06	---	---	---	---
<b>TOTAL - POINT SOURCE EMISSIONS:</b>	<b>651.53</b>	<b>132.01</b>	<b>1,295.26</b>	<b>237.12</b>	<b>17,743</b>	<b>2,128</b>	<b>1.68</b>	<b>0.79</b>	<b>21.55</b>	<b>11.18</b>
<b>PSD THRESHOLD:</b>	250 tpy		250 tpy		250 tpy		250 tpy		250 tpy	

FUG-3-G	25E	Piping and Equipment Fugitives - Gas	---	---	---	---	1.82	7.95	---	---	---	---
FUG-3-L		Piping and Equipment Fugitives - Liquid	---	---	---	---	1.24	5.43	---	---	---	---
FUG-3-M		Piping and Equipment Fugitives - Mixture	---	---	---	---	0.23	0.99	---	---	---	---
<b>FUGITIVE SOURCE SUBTOTAL - FRANCIS CS:</b>				<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>3.28</b>	<b>14.38</b>	<b>---</b>	<b>---</b>	<b>---</b>

FUGITIVE SUBTOTAL - OAK GROVE GP:	---	---	---	---	28.58	125.17	---	---	---	---
FUGITIVE SOURCE SUBTOTAL - INDEPENDENCE CS:	---	---	---	---	0.01	0.06	---	---	---	---
<b>TOTAL - FUGITIVE EMISSIONS:</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>31.88</b>	<b>139.61</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

<b>GRAND TOTAL - FRANCIS CS:</b>	<b>1.52</b>	<b>6.66</b>	<b>8.88</b>	<b>38.91</b>	<b>8.89</b>	<b>54.95</b>	<b>0.01</b>	<b>0.03</b>	<b>0.11</b>	<b>0.49</b>
GRAND TOTAL - OAK GROVE GP:	650	125	1,286	198	17,766	2,212	1.67	0.76	21.43	10.68
GRAND TOTAL - INDEPENDENCE CS:	---	---	---	---	0.07	0.12	---	---	---	---
<b>GRAND TOTAL - PLANT-WIDE EMISSIONS:</b>	<b>652</b>	<b>132</b>	<b>1,295</b>	<b>237</b>	<b>17,775</b>	<b>2,267</b>	<b>1.68</b>	<b>0.79</b>	<b>21.55</b>	<b>11.18</b>
<b>WV NSR THRESHOLD:</b>	<b>6 lb/hr AND 10 tpy</b>		<b>6 lb/hr AND 10 tpy</b>		<b>6 lb/hr AND 10 tpy</b>		<b>6 lb/hr AND 10 tpy</b>		<b>6 lb/hr AND 10 tpy</b>	
<b>TVOP THRESHOLD:</b>	<b>100 tpy</b>		<b>100 tpy</b>		<b>100 tpy</b>		<b>100 tpy</b>		<b>100 tpy</b>	

- Notes:
- 1 - Emissions are based on operation at 100% of rated load for 8,760 hr/yr; except.
    - a - Start/Stop/Maintenance (SSM-2/24E) is intermittent and 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 - Intermittent Flare Operations distorts the lb/hr emission calculations from the OGGP.



Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – HAZARDOUS AIR POLLUTANTS (HAP) – PRE-CONTROLLED**

Unit ID	Acetaldehyde		Acrolein		Benzene		Ethylbenzene		Formaldehyde		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	lb/hr	tpy	lb/hr	tpy
CE-01	0.03	0.12	0.02	0.08	1.5E-03	0.01	1.3E-04	5.9E-04	0.37	1.60	3.8E-03	0.02	0.01	0.04	1.4E-03	0.01	8.5E-04	3.7E-03	6.2E-04	2.7E-03	3.2E-03	0.01	0.43	1.89
RPC-3	---	---	---	---	1.8E-03	0.01	1.8E-03	0.01	0.01	0.05	0.01	0.06	---	---	1.8E-03	0.01	1.8E-03	0.01	1.8E-03	0.01	---	---	0.03	0.15
SSM-2	---	---	---	---	---	0.02	---	0.02	---	---	---	0.17	---	---	---	0.02	---	0.02	---	0.02	---	---	---	0.27
<b>FCS:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>3.3E-03</b>	<b>0.03</b>	<b>1.9E-03</b>	<b>0.03</b>	<b>0.38</b>	<b>1.65</b>	<b>0.02</b>	<b>0.25</b>	<b>0.01</b>	<b>0.04</b>	<b>3.2E-03</b>	<b>0.03</b>	<b>2.6E-03</b>	<b>0.03</b>	<b>2.4E-03</b>	<b>0.03</b>	<b>3.2E-03</b>	<b>0.01</b>	<b>0.46</b>	<b>2.31</b>
OGGP:	---	---	---	---	449.95	52.81	610.20	71.19	0.06	0.27	548.82	65.93	---	---	531.11	62.12	656.47	76.51	612.19	71.42	0.01	2.8E-03	3,405	400.2
ICS:	---	---	---	---	0.01	0.06	0.01	0.06	---	---	0.01	0.06	---	---	0.01	0.06	0.01	0.06	0.01	0.06	---	---	0.08	0.33
<b>PS-TOT:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>449.97</b>	<b>52.90</b>	<b>610.22</b>	<b>71.28</b>	<b>0.44</b>	<b>1.91</b>	<b>548.85</b>	<b>66.23</b>	<b>0.01</b>	<b>0.04</b>	<b>531.13</b>	<b>62.21</b>	<b>656.48</b>	<b>76.59</b>	<b>612.20</b>	<b>71.51</b>	<b>0.01</b>	<b>0.02</b>	<b>3,405</b>	<b>402.88</b>
PSD:	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
FUG-3-G	---	---	---	---	2.2E-03	0.01	2.2E-03	0.01	---	---	2.0E-02	0.09	---	---	2.2E-03	0.01	2.2E-03	0.01	2.2E-03	0.01	---	---	0.03	0.13
FUG-3-L	---	---	---	---	0.01	0.05	0.01	0.05	---	---	0.06	0.27	---	---	0.01	0.05	0.01	0.05	0.01	0.05	---	---	0.12	0.54
FUG-3-M	---	---	---	---	2.3E-03	0.01	2.3E-03	0.01	---	---	0.01	0.05	---	---	2.3E-03	0.01	2.3E-03	0.01	2.3E-03	0.01	---	---	0.02	0.10
<b>FCS:</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>0.02</b>	<b>0.07</b>	<b>0.02</b>	<b>0.07</b>	<b>---</b>	<b>---</b>	<b>0.09</b>	<b>0.41</b>	<b>---</b>	<b>---</b>	<b>0.02</b>	<b>0.07</b>	<b>0.02</b>	<b>0.07</b>	<b>0.02</b>	<b>0.07</b>	<b>---</b>	<b>---</b>	<b>0.18</b>	<b>0.78</b>
OGGP:	---	---	---	---	0.07	0.30	0.07	0.30	---	---	0.07	0.30	---	---	0.07	0.30	0.07	0.30	0.07	0.30	---	---	0.41	1.78
ICS:	---	---	---	---	8.1E-04	3.5E-03	8.1E-04	3.5E-03	---	---	8.1E-04	3.5E-03	---	---	8.1E-04	3.5E-03	8.1E-04	3.5E-03	8.1E-04	3.5E-03	---	---	4.9E-03	0.02
<b>FUG-TOT:</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>0.09</b>	<b>0.37</b>	<b>0.09</b>	<b>0.37</b>	<b>---</b>	<b>---</b>	<b>0.16</b>	<b>0.71</b>	<b>---</b>	<b>---</b>	<b>0.09</b>	<b>0.37</b>	<b>0.09</b>	<b>0.37</b>	<b>0.09</b>	<b>0.37</b>	<b>---</b>	<b>---</b>	<b>0.59</b>	<b>2.57</b>
<b>FCS:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>2.0E-02</b>	<b>0.11</b>	<b>1.9E-02</b>	<b>0.10</b>	<b>0.38</b>	<b>1.65</b>	<b>0.11</b>	<b>0.66</b>	<b>0.01</b>	<b>0.04</b>	<b>2.0E-02</b>	<b>0.11</b>	<b>2.0E-02</b>	<b>0.10</b>	<b>1.9E-02</b>	<b>0.10</b>	<b>3.2E-03</b>	<b>0.01</b>	<b>0.64</b>	<b>3.08</b>
OGGP:	---	---	---	---	450.02	53.10	610.27	71.49	0.06	0.27	548.89	66.22	---	---	531.18	62.42	656.54	76.80	612.25	71.72	0.01	2.8E-03	3,405	402.02
ICS:	---	---	---	---	0.01	0.06	0.01	0.06	---	---	0.01	0.06	---	---	0.01	0.06	0.01	0.06	0.01	0.06	---	---	0.08	0.35
<b>TOTAL:</b>	<b>0.03</b>	<b>0.12</b>	<b>0.02</b>	<b>0.08</b>	<b>450.05</b>	<b>53.27</b>	<b>610.30</b>	<b>71.65</b>	<b>0.44</b>	<b>1.91</b>	<b>549.02</b>	<b>66.94</b>	<b>0.01</b>	<b>0.04</b>	<b>531.21</b>	<b>62.58</b>	<b>656.57</b>	<b>76.97</b>	<b>612.29</b>	<b>71.88</b>	<b>0.01</b>	<b>0.02</b>	<b>3,406</b>	<b>405.46</b>
NSR:	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> 0.5 tpy	2 lb/hr <u>OR</u> 0.5 tpy	2 lb/hr <u>OR</u> 0.5 tpy	2 lb/hr <u>OR</u> 0.5 tpy	2 lb/hr <u>OR</u> 0.5 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	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
TVOP:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**

Application for Class II Administrative Update

**Attachment N - Supporting Emissions Calculations**

**Potential to Emit (PTE) – GREENHOUSE GASES (GHG) – PRE-CONTROLLED**

Unit ID	Point ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 53.06		kg/MMBtu: 1.00E-03		kg/MMBtu: 1.00E-04		TOTAL CO2e tpy
					GWP: 1	CO2 CO2e tpy	GWP: 25	CH4 CO2e tpy	GWP: 298	N2O CO2e tpy	
CE-01	22E	CAT G3516B Compressor Engine (OxCat)	11.29	8,760	6,703	6,703	32	796	0.01	3	7,502
RPC-3	23E	Rod Packing/Crankcase Leaks	---	8,760	58	58	12	289	---	---	347
SSM-2	24E	Start/Stop/Maintenance (i.e., Blowdown)	---	---	---	---	35.3	881	---	---	881
<b>POINT SOURCE SUBTOTAL - FRANCIS CS:</b>					<b>6,761</b>	<b>6,761</b>	<b>79</b>	<b>1,966</b>	<b>0.01</b>	<b>3</b>	<b>8,731</b>

POINT SOURCE SUBTOTAL - OAK GROVE GP:	136,520	136,520	2,615	65,366	0.2	68	201,955
POINT SOURCE SUBTOTAL - INDEPENDENCE CS:	16	16	262	6,561	---	---	6,577
<b>TOTAL - POINT SOURCE EMISSIONS:</b>	<b>143,297</b>	<b>143,297</b>	<b>2,956</b>	<b>73,894</b>	<b>0</b>	<b>71</b>	<b>217,262</b>

Unit ID	Point ID	Description	Heat Input MMBtu/hr (HHV)	Hours of Operation hr/yr	kg/MMBtu: 53.06	kg/MMBtu: 1.00E-03	kg/MMBtu: 1.00E-04	TOTAL CO2e tpy			
FUG-3-G	25E	Piping and Equipment Fugitives - Gas	---	8,760	0.03	0.1	4	18	---	---	57
FUG-3-L		Piping and Equipment Fugitives - Liquid	---	8,760	---	---	---	---	---	---	---
FUG-3-M		Piping and Equipment Fugitives - Mixture	---	8,760	1E-03	0.01	0.1	0.6	---	---	16
<b>FUGITIVE SOURCE SUBTOTAL - FRANCIS CS:</b>					<b>0.03</b>	<b>0.15</b>	<b>4</b>	<b>18</b>	<b>---</b>	<b>---</b>	<b>73</b>

FUGITIVE SOURCE SUBTOTAL - OAK GROVE GP:	1	1	135	3,379	---	---	5,795
FUGITIVE SOURCE SUBTOTAL - INDEPENDENCE CS:	0.2	0.2	30	750	---	---	750
<b>TOTAL - FUGITIVE EMISSIONS:</b>	<b>1.3</b>	<b>1.4</b>	<b>169</b>	<b>4,147</b>	<b>---</b>	<b>---</b>	<b>6,618</b>

<b>GRAND TOTAL - FRANCIS CS:</b>	<b>6,761</b>	<b>6,761</b>	<b>83</b>	<b>1,985</b>	<b>0.01</b>	<b>3</b>	<b>8,803</b>
GRAND TOTAL - OAK GROVE GP:	136,521	136,521	2,750	68,745	0.2	68	207,750
GRAND TOTAL - INDEPENDENCE CS:	16	16	292	7,311	---	---	7,327
<b>GRAND TOTAL - PLANT-WIDE EMISSIONS:</b>	<b>143,299</b>	<b>143,299</b>	<b>3,125</b>	<b>78,041</b>	<b>0</b>	<b>71</b>	<b>223,880</b>
TVOP THRESHOLD:	na	OR	na	OR	na	AND	100,000
PSD THRESHOLD:	na	OR	na	OR	na	AND	na

Notes: 1 - PSD Thresholds and Title V Major Source Thresholds are only applicable if other regulated air pollutants exceed the corresponding Thresholds.

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Compressor Engine Emissions – 1,380 bhp CAT G3516B (CE-01/22E)**

Unit ID (Point ID)	Description	Reference	Pollutant	Pre-Controlled Emissions				Control Efficiency	Controlled Emissions			
				g/bhp-hr	lb/MMBtu	lb/hr	tpy		g/bhp-hr	lb/MMBtu	lb/hr	tpy
CE-01/22E	<b>Engine 01</b> <b>Caterpillar (CAT)</b> <b>G3516B</b> <b>1,380 bhp</b> 1,400 rpm 4SLB / AFRC Oxidation Catalyst Manufactured/Modified After July 1, 2010 NSPS JJJJ Affected <b>8,760 hr/yr</b> 1,020 Btu/scf (HHV) <b>8,182 Btu/bhp-hr</b> 11.29 MMBtu/hr (HHV) 98,911 MMBtu/yr (HHV) 11,070 scf/hr 0.27 MMscfd 1.86 MMscf/wk 96.97 MMscf/yr	Vendor Data	NOx	0.50	0.13	1.52	6.66	---	0.50	0.13	1.52	6.66
		Vendor Data	CO	2.92	0.79	8.88	38.91	90.0%	0.29	0.08	0.89	3.89
		Vendor Data	THC	4.53	1.22	13.78	60.37	15.6%	3.82	1.03	11.63	50.94
		Vendor Data	NMHC	2.14	0.58	6.51	28.52	33.0%	1.43	0.39	4.36	19.10
		Vendor Data	NMNEHC	1.01	0.27	3.07	13.46	70.0%	0.30	0.08	0.92	4.04
		NMNEHC+HCHO	VOC	1.41	0.38	4.29	18.79	70.0%	0.42	0.11	1.29	5.64
		AP-42 Table 3.2-2	SO2	2.2E-03	5.88E-04	0.01	0.03	---	2.2E-03	5.88E-04	0.01	0.03
		AP-42 Table 3.2-2	PM10/2.5	0.04	9.99E-03	0.11	0.49	---	0.04	9.99E-03	0.11	0.49
		AP-42 Table 3.2-2	Acetaldehyde	0.03	8.36E-03	0.09	0.41	70.0%	0.01	2.51E-03	0.03	0.12
		AP-42 Table 3.2-2	Acrolein	0.02	5.14E-03	0.06	0.25	70.0%	0.01	1.54E-03	0.02	0.08
		AP-42 Table 3.2-2	Benzene	1.6E-03	4.40E-04	5.0E-03	0.02	70.0%	4.9E-04	1.32E-04	1.5E-03	0.01
		AP-42 Table 3.2-2	Ethylbenzene	1.5E-04	3.97E-05	4.5E-04	2.0E-03	70.0%	4.4E-05	1.19E-05	1.3E-04	5.9E-04
		Vendor Data	Formaldehyde	0.40	0.05	1.22	5.33	70.0%	0.12	0.02	0.37	1.60
		AP-42 Table 3.2-2	n-Hexane	4.1E-03	1.11E-03	0.01	0.05	70.0%	1.2E-03	3.33E-04	3.8E-03	0.02
		AP-42 Table 3.2-2	Methanol	0.01	2.50E-03	0.03	0.12	70.0%	2.8E-03	7.50E-04	0.01	0.04
		AP-42 Table 3.2-2	Toluene	1.5E-03	4.08E-04	4.6E-03	0.02	70.0%	4.5E-04	1.22E-04	1.4E-03	0.01
		AP-42 Table 3.2-2	2,2,4-TMP	9.3E-04	2.50E-04	2.8E-03	0.01	70.0%	2.8E-04	7.50E-05	8.5E-04	3.7E-03
		AP-42 Table 3.2-2	Xylenes	6.8E-04	1.84E-04	2.1E-03	0.01	70.0%	2.0E-04	5.52E-05	6.2E-04	2.7E-03
		AP-42 Table 3.2-2	Other HAP	3.5E-03	9.34E-04	0.01	0.05	70.0%	1.0E-03	2.80E-04	3.2E-03	0.01
		Sum	Total HAP	0.47	0.07	1.44	6.29	70.0%	0.14	0.02	0.43	1.89
Vendor Data	CO2	503	116.89	1,530	6,703	---	503	116.89	1,530	6,703		
THC-NMHC	CH4	2.39	0.64	7.27	31.85	---	2.39	0.64	7.27	31.85		
40CFR98 - Table C-2	N2O	8.2E-04	2.20E-04	2.5E-03	0.01	---	8.2E-04	2.20E-04	2.5E-03	0.01		
40CFR98 - Table A-1	CO2e	563	133.05	1,713	7,502	---	563	133.05	1,713	7,502		

Notes: 1) Fuel Heating Value may vary; 1,020 MMBtu/scf is at the low end of the range and results in a conservative fuel consumption estimate.  
 2) VOC is the sum of NMNEHC (non-methane non-ethane hydrocarbons) and formaldehyde (HCHO).

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Compressor Rod Packing and Engine Crankcase Leaks (RPC-3/23E)**

**Inlet Gas and Flash Gas**

Unit ID	Unit Description	Number of Compressors	Cylinders per Compressor	scfh per Cylinder	Contingency	Total Rod Packing Leak Rate MMscf/yr	VOC 16,500 (Inlet) 47,500 (Flash) lb/MMscf		HCHO na na lb/MMscf		n-Hexane 180 (Inlet) 600 (Flash) lb/MMscf		BTEX,TMP (Ea) 20 (Inlet) 20 (Flash) lb/MMscf		Total HAP 280 (Inlet) 700 (Flash) lb/MMscf		CO2 300 (Inlet) 300 (Flash) lb/MMscf		CH4 36,500 (Inlet) 18,900 (Flash) lb/MMscf		CO2e 912,800 (Inlet) 472,800 (Flash) lb/MMscf	
							lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RPC-3/23E	Rod Packing (I)	1	4	15	15%	0.60	1.14	4.99	na	na	0.01	0.05	1.4E-03	0.01	0.02	0.08	0.02	0.1	3	11	63	276
	Rod Packing (F)	1	3	15	15%	0.03	0.14	0.61	na	na	1.8E-03	0.01	5.9E-05	2.6E-04	2.1E-03	0.01	8.9E-04	3.9E-03	0.06	0.24	1	6

**Combustion Gas**

Unit ID	Unit Description	Total BHP	Crankcase Leak Rate 0.50 scf/bhp-hr MMscf/yr	Safety Factor	VOC 21.55 lb/MMscf		HCHO 6.11 lb/MMscf		n-Hexane 0.06 lb/MMscf		BTEX,TMP (Ea) 0.21 lb/MMscf		Total HAP 7.21 lb/MMscf		CO2 7,689 lb/MMscf		CH4 37 lb/MMscf		CO2e 8,603 lb/MMscf	
					lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
RPC-3/23E	Crankcase	1,380	6.04	250%	0.04	0.16	0.01	0.05	1.1E-04	4.8E-04	3.6E-04	1.6E-03	0.01	0.05	13	58	0.1	0.3	15	65

VOC		HCHO		n-Hexane		BTEX,TMP (Ea)		Total HAP		CO2		CH4		CO2e	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
<b>TOTAL RPC-3/23E:</b>															
1.32	5.76	0.01	0.05	0.01	0.06	1.8E-03	0.01	0.03	0.15	13	58	3	12	79	347

- Notes:
- 1 - RPC is a broad category covering leaks of natural gas from sealed surfaces, such as packing and gaskets, resulting from the wear of mechanical joints, seals, and rotating surfaces over time. It also includes the crankcase emissions from reciprocating engines.
  - 2 - Emission are based upon 40CFR98, Subpart W and manufacturer's data.
  - 3 - To be conservative, and to account for potential future changes, the following "worst-case" gas characteristics were assumed:

Pollutant	Worst-Case Inlet Gas Composition	Worst-Case Flash Gas Composition
CO2	300 lb/MMscf	300 lb/MMscf
CH4	36,500 lb/MMscf	18,900 lb/MMscf
VOC	16,500 lb/MMscf	47,500 lb/MMscf
n-Hexane	180 lb/MMscf	600 lb/MMscf
BTEX, TMP (ea)	20 lb/MMscf	20 lb/MMscf
Total HAP	280 lb/MMscf	700 lb/MMscf

4 - Total Rod Packing Leak Rate (scf/yr) =  
 No. of Compressors \* Cylinders/Compressor \*  
 scfh/Cylinder \* hr/yr operation \* (1 + Contingency)

5 - Engine crankcase emissions are based on vendor data: "As a general rule, blow-by (i.e., crankcase emissions) on a new engine is approx 0.5 scf/bhp-hr." A "safety factor" is used to account for increasing blow-by as the engines "wear".

6 - Crankcase emissions are estimated as follows:

(Data from CAT G3516B Data Sheet and Emissions Calculation Spreadsheet.)

Total Engine Exhaust (TEEx) (Volume)	9,216 ft3/min (acf/min)	1,743 MMscf/yr TEEEx*
<u>Pollutant</u>	<u>G3516B PTE</u>	<u>Crankcase Emission Factor**</u>
Crankcase THC emissions (Mass)	60.37 tpy THC	69.25 lb THC / MMscf TEEEx
Crankcase VOC emissions (Mass)	18.79 tpy VOC	21.55 lb VOC / MMscf TEEEx
Crankcase HCHO emissions (Mass)	5.33 tpy HCHO	6.11 lb HCHO / MMscf TEEEx
Crankcase n-Hexane emissions (Mass)	0.05 tpy BTEX (ea)	0.06 lb BTEX (ea) / MMscf TEEEx
Crankcase BTEX, TMP (ea) emissions (Mas:	0.18 tpy BTEX (ea)	0.21 lb BTEX (ea) / MMscf TEEEx
Crankcase HAP emissions (Mass)	6.29 tpy HAP	7.21 lb HAP / MMscf TEEEx
Crankcase CO2 emissions (Mass)	6,703 tpy CO2	7,689 lb CO2 / MMscf TEEEx
Crankcase CH4 emissions (Mass)	32 tpy CH4	37 lb CH4 / MMscf TEEEx
Crankcase CO2e emissions (Mass)	7,502 tpy CO2e	8,606 lb CO2e / MMscf TEEEx

\* Conversion from acf/min to scf/yr based on 8,760 hr/yr, 1,007 oF exhaust temp, and 68 oF std temp.

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

7 - The reciprocating compressor driven by the Caterpillar G3516B engine is expected to operate 8,760 hrs/yr.

8 - The reciprocating compressor driven by the electric motor is expected to operate a maximum of 500 hrs/yr.

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Start/Stop/Maintenance (Including Blowdown) (SSM-2/24E)**

Unit	No of Units	Total bhp	a. Engine "Cold-Start" Gas Volume	b. Blowdown Gas Volume	SSM and Blowdown	Total Gas Vented	VOC	n-Hex	BTEX,TMP	Total HAP	CH4	CO2e	
			scf/Start	scf/B-D	Events/yr	MMscf/yr	16,500 (Inlet) 47,500 (Flash) lb/MMscf tpy	180 (Inlet) 600 (Flash) lb/MMscf tpy	20 (Inlet) 20 (Flash) lb/MMscf tpy	280 (Inlet) 700 (Flash) lb/MMscf tpy	36,500 (Inlet) 18,900 (Flash) lb/MMscf tpy	GWP = 25 tpy	
SSM-2/24E	a. Cold Start (Engine)	1	na	700	---	208	0.15	1.20	0.01	1.5E-03	0.02	2.66	66
	b. Blowdown (Recip - Inlet)	1	1,380	---	8,577	208	1.78	14.72	0.16	0.02	0.25	32.56	814
	b. Blowdown (Recip - Flash)	1	55	---	342	12	4.1E-03	0.10	1.2E-03	4.1E-05	1.4E-03	0.04	1

<b>TOTAL SSM-2/24E:</b>	<b>16.02</b>	<b>0.17</b>	<b>0.02</b>	<b>0.27</b>	<b>35.25</b>	<b>881</b>
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- Notes: 1 - SSM Emissions are the sum of:
- a. Unburned fuel resulting from "cold-start" of idle gas-fired engines; and
  - b. Natural gas that is purged (aka blowdown) from the compressors and associated piping and equipment.

- 2 - Starting Gas Quantity and Blowdown (B-D) Gas Quantity as per Engineering Department.  
 (e.g., 8,577 scf/B-D of a compressor with a 1,380 bhp engine equals 6.22 scf/bhp/B-D.)

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

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

Pollutant	Inlet Gas	Flash Gas
Carbon Dioxide	300.00 lb/MMscf	300.00 lb/MMscf
Methane	36,500.00 lb/MMscf	18,900.00 lb/MMscf
Ethane	4,445.72 lb/MMscf	14,115.38 lb/MMscf
VOC	16,500.00 lb/MMscf	47,500.00 lb/MMscf
Benzene	20.00 lb/MMscf	20.00 lb/MMscf
Ethylbenzene	20.00 lb/MMscf	20.00 lb/MMscf
n-Hexane	180.00 lb/MMscf	600.00 lb/MMscf
Toluene	20.00 lb/MMscf	20.00 lb/MMscf
2,2,4-TMP (i-Octane)	20.00 lb/MMscf	20.00 lb/MMscf
Xylenes	20.00 lb/MMscf	20.00 lb/MMscf
Total HAP	280.00 lb/MMscf	700.00 lb/MMscf

- 5 - Emission estimates are conservatively based on:

<b>4.0</b>	Starts per week
<b>4.0</b>	Blowdown(s) per week - CAT G3516B Compressor
<b>1.0</b>	Blowdown(s) per month - Motor Driven Compressor

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**  
 Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Process Piping Fugitive Emissions (FUG/25E) (MODIFIED) - Page 01 of 02**

Unit	Description	Component (Unit) Type (Gas/Vapor)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	THC Emission lb/hr	VOC		n-Hexane		BTEX,TMP (Ea)		Total HAP		CO2		CH4		CO2e	
							28.296 Wgt% lb/hr	tpy	0.309 Wgt% lb/hr	tpy	0.034 Wgt% lb/hr	tpy	0.480 Wgt% lb/hr	tpy	0.514 Wgt% lb/hr	tpy	62.594 Wgt% lb/hr	tpy	lb/hr	tpy
FUG/25E	Process Piping Fugitives (Gas/Vapor)	Valves	506	0.00992	92%	0.40	0.11	0.50	1.2E-03	0.01	1.4E-04	6.0E-04	1.9E-03	0.01	2E-03	0.01	0.3	1	6	28
		Pump Seals	---	na	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Pressure Relief	17	0.01940	---	0.33	0.09	0.41	1.0E-03	4.5E-03	1.1E-04	5.0E-04	1.6E-03	0.01	2E-03	0.01	0.2	1	5	23
		Connectors	1,701	0.00044	93%	0.05	0.01	0.07	1.6E-04	7.1E-04	1.8E-05	7.9E-05	2.5E-04	1.1E-03	3E-04	1E-03	0.03	0.1	1	4
		Flanges	335	0.00086	93%	0.02	0.01	0.02	6.2E-05	2.7E-04	6.9E-06	3.0E-05	9.7E-05	0.00	1E-04	0.00	0.0	0	0	1
		Open-ended lines	3	0.00441	---	0.01	3.7E-03	0.02	4.1E-05	1.8E-04	4.5E-06	2.0E-05	6.4E-05	2.8E-04	7E-05	3E-04	0.01	0.04	0.2	1
		Compressors	2	0.00750	---	0.02	4.2E-03	0.02	4.6E-05	2.0E-04	5.1E-06	2.3E-05	7.2E-05	3.2E-04	8E-05	3E-04	0.01	0.04	0.2	1
Current Permit:	1,158	SubTotal:	2,564	SubTotal (Controlled):		0.24	1.03	2.6E-03	0.01	2.9E-04	1.3E-03	4.0E-03	0.02	4E-03	0.02	1	2	13	57	
				SubTotal (PRE-Controlled):		1.82	7.95	0.02	0.09	2.2E-03	0.01	0.03	0.13	0.03	0.14	4	18	100	440	

Unit	Description	Component (Unit) Type (Light Liquid)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	THC Emission lb/hr	VOC		n-Hexane		BTEX,TMP (Ea)		Total HAP		CO2		CH4		CO2e	
							100.000 Wgt% lb/hr	tpy	5.000 Wgt% lb/hr	tpy	1.000 Wgt% lb/hr	tpy	10.000 Wgt% lb/hr	tpy	-- Wgt% lb/hr	tpy	-- Wgt% lb/hr	tpy	lb/hr	tpy
FUG/25E	Process Piping Fugitives (Light Oil)	Valves	144	0.00551	88%	0.10	0.10	0.42	4.8E-03	0.02	9.5E-04	4.2E-03	0.01	0.04	---	---	---	---	---	---
		Pump Seals	9	0.02866	69%	0.08	0.08	0.35	4.0E-03	0.02	8.0E-04	3.5E-03	0.01	0.04	---	---	---	---	---	---
		Pressure Relief	2	0.01653	---	0.03	0.03	0.14	1.7E-03	0.01	3.3E-04	1.4E-03	3.3E-03	0.01	---	---	---	---	---	---
		Connectors	287	0.00046	93%	0.01	0.01	0.04	4.7E-04	2.0E-03	9.3E-05	4.1E-04	9.3E-04	4.1E-03	---	---	---	---	---	---
		Flanges	67	0.00024	93%	0.00	0.00	0.00	5.7E-05	2.5E-04	1.1E-05	5.0E-05	1.1E-04	0.00	---	---	---	---	---	---
		Open-ended lines	2	0.00309	---	0.01	0.01	0.03	3.1E-04	1.4E-03	6.2E-05	2.7E-04	6.2E-04	2.7E-03	---	---	---	---	---	---
		Compressors	---	0.01653	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Current Permit:	296	SubTotal:	511	SubTotal (Controlled):		0.22	0.98	0.01	0.05	2.2E-03	0.01	0.02	0.10	---	---	---	---	---	---	
				SubTotal (PRE-Controlled):		1.24	5.43	0.06	0.27	0.01	0.05	0.12	0.54	---	---	---	---	---	---	

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

2 - Updated component counts from recent LDAR monitoring w/ 15% Contingency

3 - Gas/Vapor emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, 1995, EPA-453/R-95-017

TABLE 2.4 O&G PROD (AVE)	Gas/Vapor		Light Oil	
	kg/hr	lb/hr	kg/hr	lb/hr
Valves	4.50E-03	0.00992	2.50E-03	0.00551
Pump Seals	na	na	1.30E-02	0.02866
Other <sup>(4)</sup>	8.80E-03	0.01940	7.50E-03	0.01653
Connectors	2.00E-04	0.00044	2.10E-04	0.00046
Flanges	3.90E-04	0.00086	1.10E-04	0.00024
Open-ended lines	2.00E-03	0.00441	1.40E-03	0.00309

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

5 - THC = total hydrocarbons, including methane (CH4) and ethane (C2H6).

6 - VOC = non-methane/non-ethane THC (C3+).

7 - HAP = hazardous air pollutants as designated by EPA, primarily n-hexane/BTEX.

8 - The following gas characteristics were assumed:

Pollutant	Gas/Vapor Estimated	Light Oil Estimated	Pollutant	Gas/Vapor Estimated	Light Oil Estimated
Carbon Dioxide	0.514 Wgt%	-- Wgt%	Toluene	0.034 Wgt%	1.000 Wgt%
Methane	62.594 Wgt%	-- Wgt%	Ethylbenzene	0.034 Wgt%	1.000 Wgt%
VOC (Propane)	28.296 Wgt%	100.000 Wgt%	Xylenes	0.034 Wgt%	1.000 Wgt%
n-Hexane	0.309 Wgt%	5.000 Wgt%	2,2,4-TMP	0.034 Wgt%	1.000 Wgt%
Benzene	0.034 Wgt%	1.000 Wgt%	Total HAP:	0.480 Wgt%	10.000 Wgt%

9 - LDAR Control Credit from "Leak Detection and Repair Compliance Assistance Guidance —A Best Practices Guide" Table 4-1, w/ Quarterly Monitoring and 500 ppm Leak Definition.

Table 4.1 – Control effectiveness for an LDAR program at a chemical process unit and a refinery.

Equipment Type and Service	Control Effectiveness (% Reduction)		
	Monthly Monitoring 10,000 ppmv Leak Definition	Quarterly Monitoring 10,000 ppmv Leak Definition	500 ppm Leak Definition <sup>a</sup>
<b>Chemical Process Unit</b>			
Valves – Gas Service <sup>b</sup>	87	67	92
Valves – Light Liquid Service <sup>c</sup>	84	61	88
Pumps – Light Liquid Service <sup>c</sup>	69	45	75
Connectors – All Services			93

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**  
 Application for Class II Administrative Update  
**Attachment N - Supporting Emissions Calculations**

**Process Piping Fugitive Emissions (FUG/15E) (MODIFIED) - Page 02 of 02**

Unit	Description	Component (Unit) Type (Mixture)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	THC Emission lb/hr	VOC		n-Hexane		BTEX,TMP (Ea)		Total HAP		CO2		CH4		CO2e	
							100.000 Wgt% lb/hr	tpy	5.000 Wgt% lb/hr	tpy	1.000 Wgt% lb/hr	tpy	10.000 Wgt% lb/hr	tpy	0.514 Wgt% lb/hr	tpy	62.594 Wgt% lb/hr	tpy	lb/hr	tpy
FUG/25E	Process Piping Fugitives (Mixture)	Valves	13	0.00992	88%	0.02	0.02	0.07	7.7E-04	3.4E-03	1.5E-04	6.8E-04	1.5E-03	6.8E-03	8E-05	3E-04	0.01	0.04	0.2	1
		Pump Seals	1	0.02866	69%	0.01	0.01	0.04	4.4E-04	1.9E-03	8.9E-05	3.9E-04	8.9E-04	3.9E-03	5E-05	2E-04	6E-03	0.02	0.1	0.6
		Pressure Relief	1	0.01940	---	0.02	0.02	0.08	9.7E-04	4.2E-03	1.9E-04	8.5E-04	1.9E-03	0.01	1E-04	4E-04	0.01	0.05	0.3	1
		Connectors	40	0.00046	93%	1.3E-03	1.3E-03	0.01	6.5E-05	2.8E-04	1.3E-05	5.7E-05	1.3E-04	5.7E-04	7E-06	3E-05	8E-04	4E-03	0.02	0.1
		Flanges	9	0.00086	93%	5.4E-04	5.4E-04	2.4E-03	2.7E-05	1.2E-04	5.4E-06	2.4E-05	5.4E-05	0.00	3E-06	1E-05	3E-04	1E-03	0.01	0.04
		Open-ended lines	1	0.00441	---	4.4E-03	4.4E-03	0.02	2.2E-04	9.7E-04	4.4E-05	1.9E-04	4.4E-04	1.9E-03	2E-05	1E-04	3E-03	0.01	0.1	0.3
		Compressors	1	0.01940	---	0.02	0.02	0.08	9.7E-04	4.2E-03	1.9E-04	8.5E-04	1.9E-03	0.01	1E-04	4E-04	0.01	0.1	0.3	1
Current Permit:	0	SubTotal:	66	SubTotal (Controlled):			0.07	0.30	3.5E-03	0.02	6.9E-04	3.0E-03	0.01	0.03	4E-04	2E-03	0.04	0.2	1	5
				SubTotal (PRE-Controlled):			0.23	0.99	0.01	0.05	2.3E-03	0.01	0.02	0.10	1E-03	0.01	0.1	0.6	4	16
CURRENT PERMIT:	1,454	UPDATED PERMIT:	3,141	TOTAL (Controlled):			0.53	2.32	0.02	0.08	3.2E-03	0.01	0.03	0.15	5E-03	0.02	1	2	14	62
				TOTAL (PRE-Controlled):			3.28	14.38	0.09	0.41	0.02	0.07	0.18	0.78	0.03	0.1	4	18	104	455

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

2 - Component counts in "Mixed" service estimated at: 2.0% of Gas and Liquid Components

3 - Gas/Vapor emissions calculated using EPA Protocol for Equipment Leak Emission Estimates, 1995, EPA-453/R-95-017

TABLE 2.4 O&G PROD (AVE)	Mixture (Max)	
	kg/hr	lb/hr
Valves	4.50E-03	0.00992
Pump Seals	1.30E-02	0.02866
Other <sup>(4)</sup>	8.80E-03	0.01940
Connectors	2.10E-04	0.00046
Flanges	3.90E-04	0.00086
Open-ended lines	2.00E-03	0.00441

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

5 - THC = total hydrocarbons, including methane (CH4) and ethane (C2H6).

6 - VOC = non-methane/non-ethane THC (C3+).

7 - HAP = hazardous air pollutants as designated by EPA, primarily n-hexane/BTEX.

8 - The following gas characteristics were assumed:

Pollutant	Mixture (Max) Estimated	Pollutant	Mixture (Max) Estimated
Carbon Dioxide	0.514 Wgt%	Toluene	1.000 Wgt%
Methane	62.594 Wgt%	Ethylbenzene	1.000 Wgt%
VOC (Propane)	100.000 Wgt%	Xylenes	1.000 Wgt%
n-Hexane	5.000 Wgt%	2,2,4-TMP	1.000 Wgt%
Benzene	1.000 Wgt%	Total HAP:	10.000 Wgt%

9 - LDAR Control Credit from "Leak Detection and Repair Compliance Assistance Guidance —A Best Practices Guide" Table 4-1, w/ Quarterly Monitoring and 500 ppm Leak Definition.

Table 4.1 – Control effectiveness for an LDAR program at a chemical process unit and a refinery.

Equipment Type and Service	Control Effectiveness (% Reduction)		
	Monthly Monitoring 10,000 ppmv Leak Definition	Quarterly Monitoring 10,000 ppmv Leak Definition	500 ppm Leak Definition <sup>a</sup>
<b>Chemical Process Unit</b>			
Valves – Gas Service <sup>b</sup>	87	67	92
Valves – Light Liquid Service <sup>c</sup>	84	61	88
Pumps – Light Liquid Service <sup>c</sup>	69	45	75
Connectors – All Services			93

Source: Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Nov 1995.

<sup>a</sup> Control effectiveness attributable to the HON-negotiated equipment leak regulation (40 CFR 63, Subpart H) is estimated based on equipment-specific leak definitions and performance levels. However, pumps subject to the HON at existing process units have a 1,000 to 5,000 ppm leak definition, depending on the type of process.

<sup>b</sup> Gas (vapor) service means the material in contact with the equipment component is in a gaseous state at the process operating conditions.

<sup>c</sup> Light liquid service means the material in contact with the equipment component is in a liquid state in which the sum of the concentration of individual constituents with a vapor pressure above 0.3 kilopascals (kPa) at 20°C is greater than or equal to 20% by weight.



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

Pollutant		GAS-FIRED ENGINE			GAS-FIRED TURBINE		
		AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			AP-42 Table 3.1-1; 3.1-2a; 3.1-3 04/00		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix# lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	3.17E+00	4.08E+00	2.21E+00	3.20E-01	1.30E-01	9.90E-02
	CO (≥ 90% Load)	3.86E-01	3.17E-01	3.72E+00	8.20E-02	3.00E-02	1.50E-02
	THC (TOC)	1.64E+00	1.47E+00	3.58E-01	1.10E-02	1.10E-02	1.10E-02
	NMHC (THC-CH4)	1.90E-01	2.20E-01	1.28E-01	2.40E-03	2.40E-03	2.40E-03
	NMNEHC (NMHC-C2H6)	1.19E-01	1.15E-01	5.76E-02	2.10E-03	2.10E-03	2.10E-03
	VOC	1.20E-01	1.18E-01	2.96E-02	2.10E-03	2.10E-03	2.10E-03
	SO2*** (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	3.40E-03	3.40E-03	3.40E-03
	PM10/2.5 (Filter+Cond)	4.83E-02	9.99E-03	1.94E-02	6.60E-03	6.60E-03	6.60E-03
HAPs	Acetaldehyde	7.76E-03	8.36E-03	2.79E-03	4.00E-05	4.00E-05	4.00E-05
	Acrolein	7.78E-03	5.14E-03	2.63E-03	6.40E-06	6.40E-06	6.40E-06
	Benzene	1.94E-03	4.40E-04	1.58E-03	1.20E-05	1.20E-05	9.10E-07
	Ethylbenzene	1.08E-04	3.97E-05	2.48E-05	3.20E-05	3.20E-05	3.20E-05
	Formaldehyde (HCHO)	5.52E-02	5.28E-02	2.05E-02	7.10E-04	7.10E-04	2.00E-05
	n-Hexane	4.45E-04	1.11E-03	---	---	---	---
	Methanol (MeOH)	2.48E-03	2.50E-03	3.06E-03	---	---	---
	Toluene	9.63E-04	4.08E-04	5.58E-04	1.30E-04	1.30E-04	1.30E-04
	TMP, 2,2,4- (i-Octane)	8.46E-04	2.50E-04	---	---	---	---
	Xylenes	2.68E-04	1.84E-04	1.95E-04	6.40E-05	6.40E-05	6.40E-05
	Other HAPs	1.61E-03	9.34E-04	9.39E-04	5.97E-05	5.97E-05	5.97E-05
GHG	CO2 (GWP=1)	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
	CH4 (GWP=25)	1.45E+00	1.25E+00	2.30E-01	8.60E-03	8.60E-03	8.60E-03
	N2O (GWP=298)	2.20E-04	2.20E-04	2.20E-04	3.00E-03	3.00E-03	3.00E-03
	CO2e	1.53E+02	1.48E+02	1.23E+02	1.18E+02	1.18E+02	1.18E+02

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

Pollutant		GAS-FIRED EXTERNAL COMBUSTION			FLARES	DIESEL ENGINE
		AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			13.5-1 12/16	3.3-1; 3.3-2 10/96
		Uncontrolled lb/MMBtu	LoNOx Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	(Combustion) lb/MMBtu	Uncontrolled lb/MMBtu
CRITERIA	NOX	9.80E-02	4.90E-02	3.14E-02	9.80E-02	4.41E+00
	CO	8.24E-02	8.24E-02	8.24E-02	3.10E-01	9.50E-01
	THC (TOC)	1.08E-02	1.08E-02	1.08E-02		3.60E-01
	NMHC (THC-CH4)	8.53E-03	8.53E-03	8.53E-03		3.53E-01
	NMNEHC (NMHC-C2H6)	5.49E-03	5.49E-03	5.49E-03		3.50E-01
	VOC (NMNEHC+HCHO)	5.56E-03	5.56E-03	5.56E-03		3.60E-01
	SO2 (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04		2.90E-01
	PM10/2.5 (Filter+Condense)	7.45E-03	7.45E-03	7.45E-03		3.10E-01
HAPs	Acetaldehyde	---	---	---	USE	7.67E-04
	Acrolein	---	---	---		9.25E-05
	Benzene	2.06E-06	2.06E-06	2.06E-06	≥98% DRE	9.33E-04
	Ethylbenzene	---	---	---		---
	HCHO (Formaldehyde)	7.35E-05	7.35E-05	7.35E-05	OR	1.18E-03
	n-Hexane	1.76E-03	1.76E-03	1.76E-03		---
	Methanol (MeOH)	---	---	---	External Combustion	---
	Toluene	3.33E-06	3.33E-06	3.33E-06		4.09E-04
	2,2,4-TMP (i-Octane)	---	---	---	AS APPLICABLE	---
	Xylenes	---	---	---		2.85E-04
Other HAPs	1.86E-06	1.86E-06	1.86E-06		1.05E-03	
GHG	CO2 (GWP=1)	1.18E+02	1.18E+02	1.18E+02		1.64E+02
	CH4 (GWP=25)	2.25E-03	2.25E-03	2.25E-03		6.61E-03
	N2O (GWP=298)	2.16E-03	6.27E-04	6.27E-04		1.32E-03
	CO2e	1.18E+02	1.18E+02	1.18E+02		1.65E+02

40 CFR 98 - DEFAULT EMISSION FACTORS				
Fuel Type	Table C-1 to Subpart C of Part 98		Table C-2 to Subpart C of Part 98	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	1.63E+02	6.61E-03	1.32E-03
Propane	0.091 MMBtu/gal	1.39E+02	6.61E-03	1.32E-03
Natural Gas	1,026 Btu/scf	1.17E+02	2.20E-03	2.20E-04

Conversion Factors	
1.0 lb =	453.5924 g
1.0 kg =	2.2046 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 =	1.3400 hp-hr
1.0 cf =	7.4805 gal
1.0 m =	3.2808 ft
1.0 km =	0.6214 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

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

**ATTACHMENT O**  
**Monitoring/Recordkeeping/Reporting/Testing Plans**

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

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**Williams OVM does NOT propose any changes to the monitoring, recordkeeping, reporting, and testing plans as provided in the current permit (R13-3289A).**

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## ATTACHMENT P

### Public Notice

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

The applicant shall cause such legal advertisement to appear a minimum of one (1) day in the newspaper most commonly read in the area where the facility exists or will be constructed. The notice must be published no earlier than five (5) working days of receipt by this office of your application. The original affidavit of publication must be received by this office no later than the last day of the public comment period.

The advertisement shall contain, at a minimum, the name of the applicant, the type and location of the source, the type and amount of air pollutants that will be discharged, the nature of the permit being sought, the proposed start-up date for the source and a contact telephone number for more information.

The location of the source should be as specific as possible starting with:

- 1) the street address of the source;
- 2) the nearest street or road;
- 3) the nearest town or unincorporated area;
- 4) the county; and
- 5) latitude and longitude coordinates.

Types and amounts of pollutants discharged must include all regulated pollutants (PM, PM10, VOC, SO<sub>2</sub>, Xylene, etc.) and their potential to emit or the permit level being sought in units of tons per year (including fugitive emissions).

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- Legal Advertisement (as shown) will be placed in a newspaper of general circulation in the area where the source is located (See 45CSR§13-8.3 thru 45CSR§13-8.5).
  - An Affidavit of Publication shall be submitted immediately upon receipt.
-

Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION (and OAK GROVE GP and INDEPENDENCE CS)**  
**Application for Class II Administrative Update**

**Attachment P**  
**LEGAL ADVERTISEMENT**

**AIR QUALITY PUBLIC NOTICE**  
**Notice of Application**

Notice is given that Williams Ohio Valley Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a 45CSR13 New Source Review (NSR) Class II Administrative Update for the existing Francis Compressor Station; co-located at the Oak Grove Natural Gas Processing Plant (OGGP) at 5258 Fork Ridge Road in Marshall County, West Virginia.

Latitude and longitude coordinates are 39.8738 degrees North and -80.6932 degrees West, respectively.

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

- tons of nitrogen oxides per year
- tons of carbon monoxide per year
- (0.45) tons of volatile organic compounds per year
- tons of sulfur dioxide per year
- tons of particulate matter per year
- tons of acetaldehyde per year
- tons of acrolein per year
- 5.5E-04 tons of benzene per year
- 5.5E-04 tons of ethylbenzene per year
- tons of formaldehyde per year
- (0.03) tons of n-hexane per year
- tons of methanol per year
- 5.5E-04 tons of toluene per year
- 5.5E-04 tons of 2,2,4-trimethylpentane per year
- 5.5E-04 tons of xylenes per year
- tons of other/trace HAP per year
- (0.02) tons of total hazardous air pollutants per year
- tons of carbon dioxide equivalent (CO<sub>2</sub>e) per year

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

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

Dated this the \_\_\_\_\_ day of \_\_\_\_\_ 2017.

By: Williams Ohio Valley Midstream LLC  
Paul V. Hunter  
Vice President  
Park Place Corporate Center 2  
2000 Commerce Drive  
Pittsburgh, PA 15275

**ATTACHMENT Q**  
**Business Confidential Claims**  
**(NOT APPLICABLE)**

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also

**ATTACHMENT R**  
**Authority Forms**  
**(NOT APPLICABLE)**

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**ATTACHMENT S**  
**Title V Permit Revision Information**

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The OVM Francis Compressor Station is co-located at the existing OVM Oak Grove Gas Plant. It is requested the Oak Grove Gas Plant Title V permit is updated to include the Francis Compressor Station 45CSR13 permit requirements.

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Williams Ohio Valley Midstream LLC  
**FRANCIS COMPRESSOR STATION**  
 Application for Class II Administrative Update

**Attachment S**  
**Title V Permit Revision Information**

<b>1. New Applicable Requirements Summary</b>	
Mark all applicable requirements associated with the changes involved with this permit revision:	
<input type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> <b>Minor source NSR (45CSR13)</b>	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR15)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input checked="" type="checkbox"/> <b>Section 111 NSPS (Subpart OOOOa)</b>	<input type="checkbox"/> Section 112(d) MACT standards
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqts.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> Compliance Assurance Monitoring (40CFR64) <sup>(1)</sup>
<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program Non-EGUs (45CSR1)	<input type="checkbox"/> NO <sub>x</sub> Budget Trading Program EGUs (45CSR26)
<sup>(1)</sup> If this box is checked, please include <b>Compliance Assurance Monitoring (CAM) Form(s)</b> for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why <b>Compliance Assurance Monitoring</b> is not applicable:  <b>NA</b>	



## 2. Non Applicability Determinations

List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.

### NEW SOURCE PERFORMANCE STANDARDS (NSPS)

NSPS D - No boiler greater than 250 MMBtu/hr (40CFR60.40(a)(1))  
NSPS Da - No boiler greater than 250 MMBtu/hr (40CFR60.40a(a)(1))  
NSPS Db - No boiler greater than 100 MMBtu/hr (40CFR60.40b(a))  
NSPS K - No tank greater than 40,000 gallons (40CFR 60.110(a))  
NSPS Ka - No tank greater than 151.416 m<sup>3</sup> (40,000 gal) (40CFR60.110a(a))  
NSPS Kb - No tank greater than 75 m<sup>3</sup> (19,815 gal) (40CFR60.110b(a))  
NSPS GG - No stationary gas turbine (40CFR60.330(a))  
NSPS KKK - Plant construction commenced after 08/23/11 (40CFR60.630(b))  
NSPS LLL - No sweetening units on site (40CFR60.640(a))  
NSPS IIII - No stationary compression ignition engine (§60.4200(a))  
NSPS KKKK - No stationary combustion turbine (§60.4300(a))

### NATIONAL EMISSION STANDARDS FOR HAZAROUS AIR POLLUTANTS (NESHAP)

NESHAP HH -

Not a major source of HAP and no TEG dehydration unit (§63.760(b)(2))  
NESHAP HHH - No natural gas transmission or storage prior to local distribution (§63.1270(a))  
NESHAP YYYY - No stationary gas turbine (§63.6080(a))  
NESHAP DDDDD - Not a major source of HAP (§63.7485(a))  
NESHAP JJJJJ - No boiler as defined (§63.11195(e))

### COMPLIANCE ASSURANCE MONITORING (CAM)

CAM - This rule does not apply because there no pollutant specific emission units subject to an emissions limitation or standard that require a control device be used to achieve compliance. (§64.2a)

### WEST VIRGINIA AIR QUALITY REGULATIONS

45CSR14 - Not a PSD major source or PSD major modification  
45CSR19 - Not located in a non-attainment area for NO<sub>x</sub>, CO, or VOC  
45CSR21 - Control of VOCs - Not located in Putnam, Kanawha, Cabell, Wayne, or Wood County  
45CSR27 - Exempt because equipment is used in the production and distribution of petroleum products  
45CSR28 - Voluntary Emission Trading Program - Applicant chooses not to participate  
45CSR29 - Not in Putnam, Kanawha, Cabell, Wayne, or Wood County  
45CSR34 - Not a major source of HAP or otherwise subject to NESHAP requirements

**Permit Shield Requested** (*not applicable to Minor Modifications*)

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

**3. Suggested Title V Draft Permit Language**

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision?  Yes  No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

**PLEASE CHANGE LANGUAGE IN TVOP SECTION 11.1.4A TO REFERENCE PERMIT APPLICATION R13-3289B INSTEAD OF PERMIT APPLICATION R13-3289.**

**4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision**

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
R13-3070A	01/05/16	NA
R13-3289A	01/25/17	NA

**5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision**

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
NA	NA	NA

**6. Change in Potential Emissions**

Pollutant	Change in Potential Emissions (+ or -), TPY
Nitrogen Oxides (NOx)	0.00
Carbon Monoxide (CO)	0.00
Volatile Organic Compounds (VOC)	(0.45)
Sulfur Dioxide (SO2)	0.00
Particulate Matter (PM)	0.00
Formaldehyde (HCHO)	0.00
Total Hazardous Air Pollutants (HAPs)	(0.02)

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

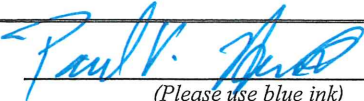
**7. Certification For Use Of Minor Modification Procedures (Required Only for Minor Modification Requests)**

*Note:* This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:

- i. Proposed changes do not violate any applicable requirement;
- ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;
- iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;
- iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;
- v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;
- vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

**Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.**

(Signed):  Date: 09 / 22 / 2017  
(Please use blue ink) (Please use blue ink)

Named (typed): **Paul V. Hunter** Title: **Vice President**

**Note: Please check if the following included (if applicable):**

<input type="checkbox"/>	Compliance Assurance Monitoring Form(s)
<input type="checkbox"/>	Suggested Title V Draft Permit Language

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

## APPLICATION FEE

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Include a check payable to WVDEP – Division of Air Quality.

As per WV Rule 22 (45CSR22) filed on May 6, 1991, a **minimum fee of ... \$300 for each Class II administrative update 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**    **Applicable**
    - NESHAP Requirements:            \$2,500    Not Applicable
    - New Major Source:                \$10,000   Not Applicable
    - Major Modifications:              \$5,000    Not Applicable
  
  - Total application fee is **\$1,300** [= \$300 minimum fee + \$1,000 additional charges]
-

**\*\*\*\*\* End of Application for Class II Administrative Update \*\*\*\***