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# ENGINEERING EVALUATION/FACT SHEET

## BACKGROUND INFORMATION

| | |
|---|---|
| Application No.: | R13-3070A |
| Plant ID No.: | 051-00157 |
| Applicant: | Williams Ohio Valley Midstream, LLC |
| Facility Name: | Oak Grove Natural Gas Processing Facility |
| Location: | Marshall County |
| SIC/NAICS Code: | 1321/211112 |
| Application Type: | Modification |
| Received Date: | January 13, 2015 |
| Engineer Assigned: | Joe Kessler (Reassigned June 15, 2015) |
| Fee Amount: | $2,000 |
| Date Received: | February 2, 2015 |
| Complete Date: | November 19, 2015 |
| Due Date: | February 17, 2015 |
| Applicant Ad Date: | January 15, 2015 |
| Newspaper: | *Moundsville Daily Echo* |
| UTM's: | 525.9 km Easting; 4,414.1 km Northing; Zone 17 |
| Latitude/Longitude: | 39.87580/-80.69590 |
| Description: | Modification to make various changes at the facility including (1) increasing the amount of waste-gases combusted at the flare, (2) revising the maximum design heat input (MDHI) of the Hot Oil and Regeneration Heaters, (3) changing the size and model of the standby generator, and (4) increasing the amount of condensate/slop oil stored and loaded out of the facility. |

On July 12, 2013, Permit Number R13-3070 was issued to Williams Ohio Valley Midstream, LLC (OVM) for the construction and operation of the Oak Grove Gas Plant. The plant was constructed to receive natural gas from upstream production wells and, using three cryogenic process trains, remove ethane, propane, and natural gas liquids (NGLs) from the gas. The facility is co-located with OVM's Independence Compressor Station that utilizes three (3) electric compressor engines. This compressor station - reviewed and granted a "no permit needed" determination under PD15-057 - is considered one-source with the Oak Grove Facility. The only emissions associated with this facility are fugitive emissions from equipment leaks.

## DESCRIPTION OF PROCESS/MODIFICATIONS

### *Existing Facility*

OVM's existing Oak Grove Gas Plant is designed to process 600 million standard cubic feet per day (mmscfd) of incoming natural gas and, using three cryogenic process trains (TXP-1, TXP-2, and TXP-3), remove ethane, propane, and natural gas liquids (NGLs) from the gas leaving "residue gas" to be used either fuel on-site or sent via a pipeline as sales gas.

Incoming untreated gas (up to come 600 mmscfd) from upstream gas wells is sent through the Pig Receivers, Inlet Slug Catcher, Inlet Filtration, and Mole Sieve Dehydrators to remove water, condensate, and other impurities to prepare the gas for introduction into the three cryogenic process trains. Raw condensate removed in the Inlet Slug Catchers is sent to the Stabilizer where it is heated using two Hot Oil Heaters (H-05 and H-06). The heat is used to drive off the lighter end hydrocarbons (methane, ethane, and propane) from the condensate. These light hydrocarbons are then sent back to the inlet gas stream for dewatering in the Mole Sieve Dehydrators. The processed condensate is combined with other collected NGLs for offsite shipment via pipeline. The three Regeneration Gas Heaters (H-02, H-03, and H-04) are used to provide heat in the Dehydrators.

Cleaned and dehydrated gas is then sent to one of three cryogenic process trains to remove ethane, propane, and heavier NGLs from the gas. The cryogenic process drops the temperature of the inlet gas to approximately -120° F. Then an expansion turbine is used to rapidly expand the chilled gases, causing the temperature to drop even further. This rapid temperature drop condenses out much of the ethane and most of the other hydrocarbons (primarily propane and butane) with small amounts of hexane, benzene, toluene, ethylbenzene, xylenes, and methane maintaining in gaseous form. As this is a totally closed system, the only emissions are fugitives from piping and equipment. The cleaned "residue gas" (primarily methane) is then sent either to be used as on-site fuel or sent to a pipeline as salable gas. Any removed liquids from the cryogenic trains is sent to one of the facility's storage tanks. The Hot Oil Heater (H-01) is used in the cryogenic trains to provide process heat.

The gases removed in the cryogenic trains are sent to the de-ethanizer where ethane is removed from the gases and then sent to the Amine Process (V-01) to remove carbon dioxide. The cleaned ethane stream is either sent to the ethane pipeline for off-site distribution or sent to the flare for destruction. The remaining hydrocarbons are condensed and combined with other NGLs for offsite shipment via pipeline.

The facility utilizes a 208,000 lb/hr Zeeco Model Number AFTA-24/80 Process Flare (5S) to combust hydrocarbons from natural gas and NGL during routine depressurization of portions of the plant for maintenance purposes. In addition, it combusts excess ethane that is not transported via the ethane pipeline.

Various storage tanks are located at the facility, but OVM has only identified four (4) that do not fall under the definition of *de minimis* under 45CSR13. These 16,800 gallon tanks currently are used to store facility wastewater (TK-1 and TK-2) and slop oil/condensate (TK-3 and TK-4).

***Proposed Modifications***

OVM is now proposing to modify the existing facility by:

- Revising the MDHI of the existing heaters to account for the incorrect calculation of the heat input at the lower "heater duty rate" rather than at MDHI in the original permit application;
- Recalculating annual emissions from all heaters at 8,760 hours per year;
- Increasing the amount of annual permitted waste gases sent to the flare (5S) from 85.50 mmscf/yr to 630.00 mmscf/yr;
- Changing the standby generator to a 224 horsepower (hp), Olympian Model G150LG2, liquid propane gas (LPG)-fired reciprocating engine;
- Revising the emissions from the Amine System;
- Revising the throughputs and contents of the existing storage tanks;
- Increasing the capacity of the product loadout terminal from 1,084,000 gal/year to 4,000,000 gal/year; and
- Making various revisions to the calculation of facility-wide fugitive emissions.

## SITE INSPECTION

Due to the nature of the source and the proposed changes, the writer deemed a site inspection as not necessary. The facility was last "Part Of Site" inspected by DAQ Compliance/ Enforcement (C/E) Inspector James Jarrett on May 14, 2015. Based on that inspection, the facility was determined to be "Status 10 - Out of Compliance." It was during this inspection that it was discovered that OVM was combusting ethane at the flare outside the scope of Permit Number R13-3070.

## AIR EMISSIONS AND CALCULATION METHODOLOGIES

OVM included in Attachment N of the permit application detailed facility-wide emissions calculations (revised based on the proposed modifications noted above). The following will only summarize the air emissions and calculation methodologies of the emission sources being modified as part of this permitting action.

***Flare Products of Combustion***

Two sources of air emissions occur at the Flare (5E): VOC/HAP emissions that pass-through the flare uncombusted and the products of combusting the organic vapors sent to the flare for destruction. This section details the products of combustion generated at the flare. Emissions (CO and $NO_x$) from the products of combustion are primarily based on emission factors as given in Texas

Commission on Environmental Quality's (TCEQ) "Flares and Vapor Oxidizers" Report (RG-109: pp. 19). These emission factors are generally accepted for estimating products of combustion from flares at oil and gas processing facilities when combusting high BTU gas streams. Additional emissions (particulate matter, $SO_2$, formaldehyde, and total HAPs) were based on emission factors given under AP-42 Section 1.4 (AP-42 is a database of emission factors maintained by USEPA). While Section 1.4 of AP-42 is used for estimating emissions from boilers combusting natural gas, in the absence of other factors, it is used to conservatively estimate the nominal amounts of expected emissions from various pollutants from flare combustion.

Hourly emissions from the flare were based on the maximum capacity of the flare of 4,624.00 mmBtu/hr. Annual emissions were based on the calculated maximum annual HHV of the gases sent to the flare: 1,061,889 mmBtu/yr. Each calculated heat rate sent to the flare is based on the expected gas volume and heat content of the various waste gas streams sent to the flare for control. An average heat content of the waste gases (HHV) of 1,802 Btu/scf (peak hourly) and 1,685 Btu/scf (average annual) were used in the calculations.

The following table details the emissions factors and revised post-modification potential-to-emit (PTE) of the products of combustion from the flare:

**Table 1: Flaring Combustion Exhaust PTE**

| Pollutant | Emission Factor | Source | Hourly (lb/hr) | Annual (ton/yr) |
|---|---|---|---|---|
| CO | 0.2755 lb/MMBtu(1) | TCEQ RG-109 (High Btu) | 1,273.91 | 146.28 |
| $NO_X$ | 0.1380 lb/MMBtu(1) | TCEQ RG-109 (High Btu) | 638.11 | 73.27 |
| $PM_{2.5}$(2) | 7.6 lb/$10^6$ lb/scf | AP-42, Table 1.4-2 | 19.50 | 2.39 |
| $PM_{10}$(2) | 7.6 lb/$10^6$ lb/scf | AP-42, Table 1.4-2 | 19.50 | 2.39 |
| PM(2) | 7.6 lb/$10^6$ lb/scf | AP-42, Table 1.4-2 | 19.50 | 2.39 |
| $SO_2$ | 0.60 lb/$10^6$ lb/scf | AP-42, Table 1.4-2 | 1.54 | 0.19 |

(1) Emission factors from TCEQ RG-109 (pp. 19) for combustion of high Btu gas streams at non-steam assist flares. OVM flare is an air-assisted flare and combusting waste gas stream with average annual heat content of 1,685 Btu.

(2) Includes condensables. However, as a smokeless flare, any particulate matter emissions under normal operations should be nominal but OVM included particulate matter emissions to be conservative.

***Pass-Through Emissions at the Flare***

Organic vapors are captured from various equipment and processes (and during various short-term scenarios) and sent to the flare for control during non-emergency operation. This includes both continuous streams and intermittent streams. OVM included in their emissions calculations an estimate of the maximum amount and characteristics of the streams sent to the flare from each piece of equipment, process, or event (it was from this data the values used to calculate the combustion exhaust emissions above was determined) . From this data (supplied in Attachment H of the permit application), OVM calculated the total annual uncontrolled VOCs and speciated HAPs sent to the flare for destruction (630.19 mmscf/yr) and the average amount of each pollutant per mmscf.

Controlled emissions were then based on the flare achieving a DRE of 99.0%. A DRE of 99.0% was reviewed and permitted for the original flare permitted under R13-3070. During the review of this permitting action, OVM supplied a letter from Zeeco - the manufacturer of the flare - that they guarantee a DRE of 99% from the OVM flare when operated within the guidelines given in the Zeeco Operating Manual.

Hourly emissions from the flare were based on the maximum capacity of the flare of 4,624.00 mmBtu/hr. Annual emissions were based on the calculated maximum annual HHV of the gases sent to the flare: 1,061,889 mmBtu/yr. Each calculated heat rate sent to the flare is based on the expected gas volume and heat content of the various waste gas streams sent to the flare for control. An average heat content of the waste gases (HHV) of 1,802 Btu/scf (peak hourly) and 1,685 Btu/scf (average annual) were used in the calculations.

The following table details the post-modification pass-through organic emissions at the flare generated by a various continuous and intermittent waste gas streams:

**Table 2: Flaring Organics Pass-Through PTE**

| Pollutant | Weight %[1] | lb/mmBtu [1] | Uncontrolled | | Controlled @ 99% | |
|---|---|---|---|---|---|---|
| | | | lb/hr[2] | ton/yr[3] | lb/hr | ton/yr |
| VOCs | 4.30 | 3.83 | 17,709.92 | 2,033.52 | 177.10 | 20.34 |
| *Benzene* | *0.08* | *0.10* | *462.40* | *53.09* | *4.62* | *0.53* |
| *Ethylbenzene* | *0.08* | *0.13* | *601.12* | *69.02* | *6.01* | *0.69* |
| *n-Hexane* | *0.09* | *0.12* | *554.88* | *63.71* | *5.55* | *0.64* |
| *Toluene* | *0.08* | *0.11* | *508.64* | *58.40* | *5.09* | *0.58* |
| *2,2,4-TMP* | *0.08* | *0.14* | *647.36* | *74.33* | *6.47* | *0.74* |
| *Xylenes* | *0.08* | *0.13* | *601.12* | *69.02* | *6.01* | *0.69* |
| Total HAPs | 0.49 | 0.74 | 3,421.76 | 392.90 | 34.22 | 3.93 |

(1) These values based on actual stream data taken from the Oak Grove Plant and summarized in Attachment H of the permit application.

(2) Based on the maximum short-term heat input of waste-gases sent to the flare: 4,624 mmBtu/hr.

(3) Based on the estimated maximum annual heat input of waste gases sent to the flare: 1,061,889 mmBtu/yr.

### *Heater Emissions*

Potential emissions from the natural gas-fired heaters (1E through 7E) were based on emission factors provided by the unit vendors and as given in AP-42, Section 1.4. Hourly emissions were recalculated and based on the rated MDHI of each heater. Individual unit annual emissions were recalculated for the purposes of this permit on 8,760 hours of operation per year. A fuel gas heat content of 1,020 Btu/scf was used in the calculations.

***Amine Process Unit Emissions***

Potential emissions from the Amine Process Unit (16E) were based on process simulation by the Dow Chemical Company Gas Treating Technology Group and were revised to reflect changes in operating scenarios at the facility.

***Emergency Standby Generator***

Potential emissions from the 224 hp, Olympian Model G150LG2, LPG-fired reciprocating engine (9E) was based on the applicable emission standards given under 40 CFR 60, Subpart JJJJ (CO and $NO_x$) and emission factors given in AP-42, Section 3.2. Where applicable, hourly emissions were based on an MDHI of the unit of 2.19 mmBtu/hr (based on a conversion rate of 2,500 Btu/hp HHV) and annual emissions were based on operation of 500 hours per year.

***Storage Tanks***

Potential uncontrolled VOC emissions associated with the Slop Oil/Condensate Storage Tanks (10E through 13E) were calculated using the TANKS 4.09d program as provided under AP-42, Section 7. (working/breathing emissions) and were based on the ProMax software (flashing emissions). ProMax software is chemical process simulator for design and modeling of amine gas treating, glycol dehydration units, and other natural gas components.

***Truck Loading***

Air emissions from Slop Oil/Condensate truck loading operations (14E) occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-1. In this equation, OVM used variables specific to the liquids loaded and to the method of loading - in this case "splash loading." Additionally, worst-case annual emissions were based on a maximum loading of 4,000,000 gallons. Maximum hourly emission rates were based on a maximum hourly loading rate of ~250 gallons.

***Fugitive Emissions***

Process and Piping Components

OVM based their uncontrolled recalculated fugitive process and piping components leak calculations (15E) on emission factors taken from the document EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates." Emission factors were taken from Table 2-4 and controlled emissions from various sources (valves and connectors) were based on the Table 5-2 and the use of a Leak Detection and Repair (LDAR) protocol that meets the minimum requirement of a 10,000 $ppm_v$ leak definition and monthly monitoring. VOC emissions were based on light liquid (100% by weight) and gas (24.02% by weight) VOC contents. HAP emissions were based on the actual speciated weight percentages of the HAPs in the applicable streams. Component counts were based on actual counts and design estimates.

Other Equipment Leaks

OVM estimated new fugitive leaks of natural gas/propane from other potential sources such as leaks from dry gas seals, packing and gaskets, resulting from the wear of mechanical joints, seals, and rotating surfaces over time. The leak rates of these components are based on vendor and engineering estimates. VOC/HAP emissions rates are then based on representative gas samples.

***Emissions Summary***

Based on the above estimation methodology as submitted in Attachment N of the permit application, the revised post-modification facility-wide PTE of the Oak Grove Natural Gas Processing Facility is given in Attachment A. The change in annual facility-wide PTE as a result of the modifications evaluated herein is given in the following table:

**Table 3: Change in Facility-Wide Annual PTE (in tons/year)**

| Pollutant | Pre-Modification | R13-3070A | Change |
|---|---|---|---|
| CO | 72.27 | 192.66 | 120.39 |
| $NO_X$ | 41.64 | 121.26 | 79.62 |
| $PM_{2.5}/PM_{10}/PM$ | 5.58 | 10.69 | 5.11 |
| $SO_2$ | 0.46 | 0.77 | 0.31 |
| VOCs | 72.09 | 112.06 | 39.97 |
| Total HAPs | 16.00 | 14.18 | (1.82) |

(1) Emissions taken from R13-3070 and PD15-057 Engineering Evaluation/Fact Sheets.

## REGULATORY APPLICABILITY

This section will address the potential regulatory applicability/non-applicability of substantive state and federal air quality rules relevant to the emission units/sources modified at the Oak Grove Natural Gas Processing Facility.

***45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers.***

45CSR2 "establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units." Each of the natural gas-fired heaters have each been determined to meet the definition of a "fuel burning unit" under 45CSR2 and are, therefore, subject to the applicable requirements therein. However, pursuant to the exemption given under §45-2-11, as the MDHI of the TXP1 Regeneration Gas Heater is less than 10 mmBtu/hr, this unit is not subject to sections 4, 5, 6, 8 and 9 of 45CSR2. The only remaining substantive requirement for the TXP1 Regeneration Gas Heater is under Section 3.1 - Visible Emissions Standards. Each substantive 45CSR2 requirement is discussed below.

45CSR2 Opacity Standard - Section 3.1

Pursuant to 45CSR2, Section 3.1, each of the natural gas-fired heaters are subject to an opacity limit of 10%. Proper maintenance and operation of the units (and use of natural gas as fuel) should keep the opacity of the units well below 10% during normal operations.

45CSR2 Weight Emission Standard - Section 4.1.b

The allowable particulate matter (PM) emission rate for each of the non-exempt natural gas-fired heaters, identified as Type "b" fuel burning units, per 45CSR2, Section 4.1(b), is the product of 0.09 and the total design heat input of the units in million Btu per hour. The maximum aggregate design heat input (short-term) of the non-exempt units will be 213.96 mmBtu/Hr. Using the above equation, the 45CSR2 facility-wide PM emission limit of the units will be 19.26 lb/hr. This limit represents filterable PM only and does not include condensable PM. The exemption of condensable PM is located within the 45CSR2 Appendix - which establishes compliance test procedures - by not requiring measurement of the condensable PM. The maximum potential hourly PM emissions during normal operations from the units (*including* condensables) is estimated to be 1.82 lb/hr. This emission rate is 9.44% of the 45CSR2 limit.

45CSR2 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of 45CSR2 requires testing for initial compliance with the limits under Section 3 and 4, monitoring for continued compliance, and record-keeping of that compliance. The TMR&R requirements are clarified under 45CSR2A and discussed below.

45CSR2A Applicability - Section 3

Pursuant to 45CSR2, Section 3.1(b), the owner or operator of a "fuel burning unit(s) which combusts only natural gas shall be exempt from sections 5 and 6." Therefore, there are no substantive performance testing or monitoring requirements under 45CSR2 for the fuel burning units (natural gas-fired heaters).

45CSR2A Record-keeping and Reporting Requirements - Section 7

Section 7 sets out the record-keeping requirements that OVM has to meet under 45CSR2A for the fuel burning units. For units that combust only pipeline natural gas, the record-keeping requirements are limited to the date and time of start-up and shutdown, and the quantity of fuel consumed on a monthly basis.

***45CSR6: To Prevent and Control Particulate Air Pollution from Combustion of Refuse***

OVM's flare is defined as an "incinerator" under 45CSR6 and is, therefore, subject to the requirements therein. The substantive requirements applicable to the units are discussed below.

45CSR6 Emission Standards for Incinerators - Section 4.1

Section 4.1 limits PM emissions from incinerators to a value determined by the following formula:

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is as indicated in Table I below:

**Table I:** Factor, F, for Determining Maximum Allowable Particulate Emissions

| Incinerator Capacity | Factor F |
|---|---|
| A. Less than 15,000 lbs/hr | 5.43 |
| B. 15,000 lbs/hr or greater | 2.72 |

Based on information included in the application, the capacity of the flare is 208,000 lb/hr (140 tons/hour). Pursuant to the above equation, the particulate matter limit of the flare is 380.80 lbs/hr. When properly operated, particulate matter emissions from the flare are expected to be negligible and in compliance with the limit calculated under Section 4.1. However, OVM did include a particulate matter emission estimate for the flare based on the use of an AP-42 emission factor for natural gas combustion. This emission factor produced a particulate matter emission rate of 19.50 lb/hr which is below the 45CSR6 limit.

45CSR6 Opacity Limits for - Section 4.3, 4.4

Pursuant to Section 4.3, and subject to the exemptions under 4.4, the flare has a 20% limit on opacity during operation. Proper design and operation of the flare should prevent any substantive opacity from the flare.

***45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides***

The purpose of 45CSR10 is to "prevent and control air pollution from the emission of sulfur oxides." 45CSR10 has requirements limiting $SO_2$ emissions from "fuel burning units," limiting in-stack $SO_2$ concentrations of "manufacturing process source operations," and limiting $H_2S$ concentrations in "process gas" streams that are combusted. As noted under the discussion of 45CSR2 applicability, the natural gas-fired heaters are each defined as a "fuel burning unit" and, therefore, subject to the applicable requirements discussed below.

45CSR10 Fuel Burning Units - Section 3

Pursuant to §45-10-10.1, as the MDHI of the TXP1 Regeneration Gas Heater is less than 10 mmBtu/hr, it is exempt from the requirements of Section 3.

The allowable sulfur dioxide ($SO_2$) emissions from the non-exempt natural gas-fired heaters, each identified as a Type "b" fuel burning unit in a Priority I Region (which includes Marshall County), per 45CSR10, Section 3.1.e, is the product of 3.1 and the total design heat input of all units in million Btu per hour. The total design heat input of the non-exempt natural gas-fired heaters is 213.96 mmBtu/hr. Using the above equation results in a $SO_2$ limit of 663.28 pounds per hour. The

maximum aggregate potential $SO_2$ emissions from the Hot Oil Heaters are estimated to be 0.14 pounds per hour. This emission rate is only a trace of the 45CSR10 limit.

45CSR10 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of 45CSR10 requires testing for initial compliance with the limits therein, monitoring for continued compliance, and record-keeping of that compliance. Interpretative Rule 45CSR10A provides guidance and clarification for complying with the testing, monitoring, recordkeeping and reporting requirements of 45CSR10.

Pursuant to §45-10-10.3 and §45-10-3.1(b), as the natural gas-fired heaters "combust natural gas, wood or distillate oil, alone or in combination," they are not subject to the Testing and MRR Requirements under Section 8 of 45CSR10 or 45CSR10A.

***45CSR13: 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***

The proposed changes to the Oak Grove Natural Gas Processing Facility have the potential to increase the PTE of the facility in excess of six (6) lbs/hour and ten (10) TPY of a regulated pollutant (see Table 3 above) and, therefore, pursuant to §45-13-2.17, the changes are defined as a "modification" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, OVM is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 ("Notice Level A"), OVM placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on January 15, 2015 in *Moundsville Daily Echo* and the affidavit of publication for this legal advertisement was submitted on January 30, 2015.

***45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)***

The Oak Grove Natural Gas Processing Facility is located in Marshall County, WV. Marshall County is classified as "in attainment" with all National Ambient Air Quality Standards (NAAQS) except for, in certain tax districts, $SO_2$. The Clay Tax District, where the Moundsville facility is located, is classified as "non-attainment" for $SO_2$. Therefore, applicability to major New Source Review (NSR) for all pollutants except for $SO_2$ is determined under 45CSR14.

As the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all criteria pollutants (with the exception of $SO_2$) is 250 TPY. As given above in Attachment A, the facility-wide post-modification PTE of the Oak Grove Natural Gas Processing Facility is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 45CSR14.

It is also important to note that the facility does not contain a "nested" major stationary source - in this case a secondary listed source: "Fossil Fuel Boilers (or combinations thereof) Totaling More than 250 Million Btu/hour Heat Input." All the natural-gas fired heaters would contribute to this 250 mmBtu/hr threshold. However, the aggregate MDHI of all the heaters is 223.36 mmBtu/hr. Therefore, no "nested" source is located at the Oak Grove Natural Gas Processing Facility.

***45CSR19: Requirements fo Pre-Construction Review, Determination of Emission Offsets for Proposed New or Modified Stationary Sources of Air Pollutants and Emission Trading for Intrasource Pollutants - (NON APPLICABILITY)***

Pursuant to §45-19-3.1, 45CSR19 "applies to all major stationary sources and major modifications to major stationary sources proposing to construct anywhere in an area which is designated non-attainment." As noted above, the Oak Grove Natural Gas Processing Facility is located in Marshall County, WV which is classified as in attainment with all NAAQS; with the exception for $SO_2$ in the areas defined as the Clay (where the source is located) , Washington, and Franklin Tax Districts. Pursuant to §45-14-2.35, the individual major source applicability threshold for all non-attainment pollutants is 100 TPY. As given in Attachment A, the facility-wide post-modification $SO_2$ PTE of the Oak Grove Natural Gas Processing Facility is less than 100 TPY. Therefore, the facility is not defined as a "major stationary source" under 45CSR19.

***45CSR30: Requirements for Operating Permits***

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. As a result of the changes evaluated herein, the facility will meet the definition of a "major source under § 112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. Therefore, the Oak Grove Natural Gas Processing Facility is subject to 45CSR30. The Title V (45CSR30) application will be due within twelve (12) months after the commencement date of any operation authorized by the draft permit.

***40 CFR 60, Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units***

Subpart Dc of 40 CFR 60 is the federal NSPS for "steam generating units" that have a Maximum Design Heat Input (MDHI) of less than 100 MMBtu/Hr and greater than 10 MMBtu/Hr and that were constructed, modified, or reconstructed after June 9, 1989. Subpart Dc contains within it emission standards, compliance methods, monitoring requirements, and reporting and record-keeping procedures for affected facilities applicable to the rule.

Pursuant to §60.40c(a), Subpart Dc applies to "each steam generating unit that commences construction . . . after June 9, 1989, and that has a maximum design heat input capacity of. . . 100 mmBtu/hr or less, but greater than or equal to 10 mmBtu/hr." Subpart Dc defines a "Steam Generating Unit" as "a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium." Each of the natural gas-fired heaters, with the exception of the TXP1 Regeneration Gas Heater (9.40 mmBtu/hr), meet the above applicability requirements and are subject

to the Subpart Dc. Subpart Dc does not, however, have any emission standards for combusting only natural gas. Therefore, the natural gas-fired heaters are only subject to the record-keeping and reporting requirements given under §60.48c.

***40 CFR60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (NON APPLICABILITY)***

Subpart Kb of 40 CFR 60 is the NSPS for storage tanks containing Volatile Organic Liquids (VOLs) which construction commenced after July 23, 1984. The Subpart applies to storage vessels used to store volatile organic liquids with a capacity greater than or equal to 75 $m^3$ (19,813 gallons). However, storage tanks with a capacity greater than or equal to 151 $m^3$ (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 $m^3$ but less than 151 $m^3$ storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from Subpart Kb. Additionally, pursuant §60.110b(b)(2), "[p]ressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere" are exempt from Subpart Kb.

None of the storage tanks located at the Oak Grove Natural Gas Processing Facility meet any of the above applicability requirements.

***40CFR60 Subpart KKK: Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants - (NON APPLICABILITY)***

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984 and on or before August 23, 2011. The Oak Grove Natural Gas Processing Facility was constructed after August 23, 2011. OVM is required to meet all applicable LDAR requirements of Subpart OOOO for natural gas processing facilities (see below).

***40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines***

OVM's proposed 224 hp, Olympian Model G150LG2, 4-Stroke Rich Burn (4SRB) LPG-fired reciprocating emergency engine is defined under 40 CFR 60, Subpart JJJJ as a stationary spark-ignition internal combustion engine (SI ICE) and is, pursuant to §60.4230(a)(4)(iv), subject to the applicable provisions of the rule (it is listed in the permit application as manufactured after July 1, 2010). Pursuant to §60.4233(c): "Owners and operators of stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) manufactured on or after the applicable date in §60.4230(a)(4) that are rich burn engines that use LPG must comply with the emission standards in §60.4231(c) for their stationary SI ICE." The language under §60.4231(c) states that "[s]tationary SI internal combustion engine manufacturers must certify their stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) (except emergency stationary ICE with a maximum engine power greater than 25 HP and less than 130 HP) that are rich burn engines that use LPG and that are manufactured on or after the applicable date in §60.4230(a)(2), or manufactured on or after the applicable date in §60.4230(a)(4) for emergency stationary ICE with a maximum engine power greater than or equal to 130 HP, to the certification emission standards and other requirements for new nonroad SI engines in 40 CFR part 1048."

Based on the engine's EPA Certificate of Conformity submitted by OVM, the engine family of the proposed engine is certified as in compliance with the 40 CFR part 1048 standards (in this case 2.0 g-($HC+NO_x$)/bhp-hr and 3.3 g-CO/bhp-hr).

***40 CFR 60, Subpart OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution***

On April 27, 2012, the USEPA issued a final rule (with amendments finalized on August 16, 2012) that consists of federal air standards for natural gas wells that are hydraulically fractured, along with requirements for several other sources of pollution in the oil and gas industry that currently were previously not regulated at the federal level. Each section of Subpart OOOO potentially applicable to a new or modified source is discussed below.

Reciprocating Compressors

Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

There are three (3) reciprocating internal combustion engine located at the Oak Grove Natural Gas Processing Facility (the three electric compressors co-located at the "Independence Compressor Station") that were constructed after August 23, 2011. Therefore, the requirements regarding reciprocating compressors under 40 CFR 60 Subpart OOOO would apply. Williams is required to perform the following:

- Replace the reciprocating compressor rod packing at least every 26,000 hours of operation or 36 months.
- Demonstrate initial compliance by continuously monitoring the number of hours of operation or track the number of months since the last rod packing replacement.
- Submit the appropriate start up notifications.
- Submit the initial annual report for the reciprocating compressors.
- Maintain records of hours of operation since last rod packing replacement, records of the date and time of each rod packing replacement, and records of deviations in cases where the reciprocating compressor was not operated in compliance.

Storage Tanks (NON-APPLICABILITY)

Each storage vessel affected facility, which is a single storage vessel, located in the oil and natural gas production segment, natural gas processing segment, or natural gas transmission and

storage segment is potentially applicable to the storage tank requirements of Subpart OOOO. Subpart OOOO defines a storage vessel as a unit that is constructed primarily of non-earthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

- Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.

- Process vessels such as surge control vessels, bottoms receivers or knockout vessels.

- Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tons/year of VOCs, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup. Based on a letter from USEPA to the American Petroleum Instituted dated September 28, 2012, the applicability of storage vessels to this reduction requirement of Subpart OOOO is based on each individual tank's PTE (which includes federally enforceable control devices) as compared to the 6 tons/year.

Therefore, based on the above, the storage tanks located at the Oak Grove Natural Gas Processing Facility are exempt from Subpart OOOO as each of these tanks have uncontrolled emissions less than 6 tons/year.

Leak Detection and Repair Requirements (LDAR)

The substantive requirement for affected facilities at a natural gas processing plant is to meet the applicable LDAR conditions under Subpart VVa. The Oak Grove Natural Gas Processing Facility is a natural gas processing plant that was modified after August 23, 2011. Therefore, LDAR requirements for onshore natural gas processing plants will continue to apply to the facility.

***40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines***

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Oak Grove Natural Gas Processing Facility is defined as an area source of HAPs (see Attachment A), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

> An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that "[a] new or reconstructed stationary RICE located at an area source" is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by "meeting the requirements of . . . 40 CFR part 60 subpart JJJJ, for spark ignition engines." Pursuant to §63.6590(a)(2)(iii), a "stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006." The new standby engine proposed for the Oak Grove Natural Gas Processing Facility is defined as a new stationary RICE and, therefore, is required to show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

## TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Oak Grove Natural Gas Processing Facility and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen ($NO_x$), Ozone, Particulate Matter ($PM_{10}$, and $PM_{2.5}$), and Sulfur Dioxide ($SO_2$). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) standards promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The Oak Grove Natural Gas Processing Facility has the potential to emit the following HAPs as in substantive amounts: Formaldehyde, n-Hexane, Benzene, Toluene, Ethylbenzene, Xylenes, and 2,2,4-Trimethylpentane. The following table lists each HAP's carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

**Table 4: Potential HAPs - Carcinogenic Risk**

| HAPs | Type | Known/Suspected Carcinogen | Classification |
|---|---|---|---|
| **n-Hexane** | VOC | No | Inadequate Data |
| **Formaldehyde** | VOC | Yes | B1 - Probable Human Carcinogen |
| **Benzene** | VOC | Yes | Category A - Known Human Carcinogen |
| **Toluene** | VOC | No | Inadequate Data |

| HAPs | Type | Known/Suspected Carcinogen | Classification |
|---|---|---|---|
| **Ethyl-benzene** | VOC | No | Category D - Not Classifiable |
| **Xylenes** | VOC | No | Inadequate Data |
| **2,2,4-Trimethylpentane** | VOC | No | Inadequate Data |

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

## AIR QUALITY IMPACT ANALYSIS

The proposed modification does not meet the definition of a "major modification" pursuant to 45CSR14 and, therefore, an air quality impact (computer modeling) analysis was not required. Additionally, based on the nature of the proposed modification, modeling was not required under 45CSR13, Section 7.

## MONITORING, COMPLIANCE DEMONSTRATIONS, RECORD-KEEPING, AND REPORTING REQUIREMENTS

The modifications evaluated herein were integrated into the existing monitoring, compliance demonstration, and reporting, and record-keeping requirements.

## PERFORMANCE TESTING OF OPERATIONS

The modifications evaluated herein were integrated into the performance testing requirements.

## CHANGES TO R13-3070

The following substantive changes were made to Permit Number R13-3070:

- The Emissions Units Table 1.0 was revised to reflect the changes evaluated herein;
- The Control Devices Table 1.1 was revised to list the updated emission units and sources sent to the flare for control;

- Section 5.0 was revised with updated MDHI and emissions of the natural gas-fired heaters;
- Requirement 6.1.1. was revised to reference the updated emission units and sources sent to the flare for control and a requirement was added to to limit the maximum annual waste-gas flow rate to the flare;
- Table 6.1.2(a) was revised by removing the $CO_2e$ emission limits and the VOC pass-through emission limits. Additionally, the combustion exhaust emissions of the flare were revised to reflect the new emission calculations;
- Table 6.1.2(b) was added with the revised VOC pass-through emissions and the speciated HAP pass-through emissions;
- Requirement 6.1.3. was revised to include more specific model and operating data of the flare;
- Requirement 6.2.2. was revised to require OVM to monitor and record the aggregate waste-gas flow rate to the flare specifically to show compliance with the limit under 6.1.4.;
- The model, size, and emissions of the standby generator were updated in Section 7.0;
- The emissions of the Amine Process Vent were revised under Table 10.1.3;
- The truck loadout throughput limit was revised under Section 11.0; and
- The storage tank descriptions and throughput limits were revised under Section 12.0.

**RECOMMENDATION TO DIRECTOR**

The information provided in permit application R13-3070A indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3070A to Williams Ohio Valley Midstream, LLC for the modifications discussed herein at the Oak Grove Natural Gas Processing Facility located near Moundsville, Marshall County, WV.

Joe Kessler, PE
Engineer

Date