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ENGINEERING EVALUATION/FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2892E
Plant ID No.:	051-00141
Applicant:	Williams Ohio Valley Midstream, LLC
Facility Name:	Moundsville Fractionation Plant
Location:	Marshall County
SIC/NAICS Code:	1321/211112
Application Type:	Modification
Received Date:	June 13, 2016 (Original Application) January 17, 2017 (Revised Application)
Engineer Assigned:	Joe Kessler
Fee Amount:	$4,500
Date Received:	June 14, 2016 ($1,300) February 8, 2017 ($3,200)
Complete Date:	February 13, 2017
Due Date:	May 14, 2017
Applicant Ad Date:	January 18, 2017
Newspaper:	*Moundsville Daily Echo*
UTM's:	Easting: 517.347 km Northing: 4,418.11 km Zone: 17
Latitude/Longitude:	39.9129/-80.7970
Description:	Request to increase the component counts (and associated fugitive emissions) for Process and Piping Fugitives and modifying the size and number of pressurized storage tanks.

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On December 28, 2011, Permit Number R13-2892 was issued to Caiman Eastern Midstream, LLC (CEM) for the construction and operation of the Ohio River Fractionation Plant. The plant was constructed to fractionate natural gas liquids (NGL) into three (3) products: propane, butane, and natural gasoline. On May 15, 2012, CEM changed its name to Williams Ohio Valley Midstream (OVM) and the facility is now referred to as the Moundsville Fractionation Plant. Since that time, the facility has been subject to the following new source review (NSR) permitting actions:

- On February 7, 2013, OVM was issued a Class II Administrative Update (A/U) as R13-2892A to increase the maximum design heat input (MDHI) of the Hot Oil Heater and increase the number of piping components that contribute to fugitive VOC losses;

- On March 5, 2013, OVM was issued Permit Number R13-2892B primarily to expand the capabilities of the facility through the addition of a stabilizer and associated heater that removes residue methane/ethane in the incoming NGLs to allow the sale of stabilized NGL;

- On May 28, 2013, OVM was issued Permit Number R13-2892C to install a new fractionation train and replace the existing flare;

- On March 31, 2015, OVM was issued General Permit Registration Number G60-C069 for the installation of a propane-fired emergency generator; and

- On October 19, 2015, OVM was issued Permit Number R13-2892D to make various changes at the facility including (1) increasing capacity of natural gasoline tanks and (2) increasing amount of waste gases sent to the flare.

On June 13, 2016, OVM applied for a Class II Administrative Update to increase the component counts (and associated fugitive emissions) for Process and Piping Fugitives at the facility. During the review of the application, the writer discovered that the proposed changes would increase the potential-to-emit of n-Hexane (defined as a Hazardous Air Pollutant) over ten (10) tons per year which would in turn define the facility as a major source of HAPs. This change would necessitate additional permitting review requirements that could not be satisfied by a Class II Administrative Update. Therefore, on January 17, 2017, OVM submitted a revised permit application to address these additional permitting review requirements.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility

OVM's existing Moundsville Fractionation Plant processes up to a maximum of 42,500 barrels per day (BPD) of natural gas liquids (NGL) and therefrom produces three (3) products: propane, butane, and natural gasoline.

The facility receives raw NGL from area wells and places it in a series of twelve (12) pressure vessels (3S) ranging from 61,400 to 90,000 gallons in capacity. The primary purpose of these tanks is to act as a buffer for variations in the rate of NGL receipt to ensure a steady flow rate through the process, and providing plant storage. As these tanks are under pressure, there is no escape of vapors from these units. The NGL is then processed through two (2) fractionation trains (1S): each train is a series of distillation processes (de-propanizer and de-butanizer towers) to generate the desired products. The distillation process first removes the propane and then the mixed butanes from the NGL. The remaining liquid is classified as "natural gasoline." The three products are accumulated in a series of nineteen (17) pressurized tanks and two (2) non-pressurized tanks ranging from 60,000 to 454,000 gallons in capacity.

The facility uses one (1) 45.54 mmBtu/hr and two (2) 89.85 mmBtu/hr natural gas-fired Hot Oil Heaters (HTR-1, HTR-2) to precisely control the temperature within certain process equipment. In addition, the facility is capable of loading out products into both trucks and rail cars (2S). Truck and rail loading of the products (and potentially un-processed NGL) is controlled by the flare.

The facility includes a flare that is used to combust NGL or products in the event of an emergency that requires rapid removal of NGL and/or product from one or more portions of the facility. The flare is also used to combust NGL and/or one or more of the products when an area of the plant must be de-pressurized for maintenance/repairs. Additionally, the flare is used to control process gases during normal operation. The flare has a permitted destruction and removal efficiency (DRE) of 99.0% (as originally determined and permitted under R13-2892C).

Proposed Modifications

OVM is now, after a thorough review of the as-built equipment and process on-site, proposing to modify the existing facility by increasing the component counts (and associated fugitive emissions) for Process and Piping Fugitives (1S, 7S) and modifying the size and number of pressurized storage tanks (3S). The proposed changes to the pressurized storage tanks will have no impact on the potential-to-emit of the facility as these tanks have no emissions to the atmosphere.

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 "Full On Site" inspected by DAQ Compliance/ Enforcement (C/E) Inspector Mr. Jamie Jarrett on September 22, 2015.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

The following will only discuss the air emissions and calculation methodologies of the *emission sources* (does not include the pressurized storage tanks) being modified as part of this permitting action.

Fugitive Emissions

Process and Piping Components

OVM based their revised uncontrolled fugitive process and piping components leak calculations (1S) 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 were based on the EPA document "Leak Detection and Repair (LDAR) - A Best Practices Guide," Table 4.1 (as based on an LDAR program using a 500 ppm detection protocol). The Moundsville facility is subject to 40 CFR 60, Subpart OOOO which requires an LDAR program based on a leak detection protocol of 500 ppm. Additionally, VOC emissions were conservatively based on all light liquid and gas streams having 100% VOC contents. HAP emissions were based on the actual speciated weight percentages of the HAPs in the applicable streams (as-tested). Component counts were based on updated actual counts.

Emissions Summary

Based on the above estimation methodology, the revised post-modification potential-to-emit (PTE) of the Moundsville Fractionation Plant 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 1: Change in Facility-Wide Annual PTE (in tons/year)

Pollutant	Pre-Modification(1)	Post-Modification	Change
CO	146.38	146.38	0.00
NO_X	79.17	79.17	0.00
$PM_{2.5}/PM_{10}/PM$	5.74	5.74	0.00
SO_2	0.46	0.46	0.00
VOCs	216.58	215.53	-1.05
Total HAPs	11.62	14.61	2.99
n-Hexane	9.39	11.82	2.43

(1) Emissions taken from R13-2892D Engineering Evaluation/Fact Sheet (Attachment A).

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 Moundsville Fractionation Plant and those for which applicability may change as a result of the facility becomiong a major source of HAPs..

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 Moundsville Fractionation Plant have the potential to increase a regulated pollutant (see Table 1 above). However, as no regulated pollutant is increased is in excess of the thresholds that would define the changes as a "modification" under §45-13-2.17 the changes would normally be eligible to be reviewed as a Class II Administrative Update. However, as the permitting action includes the transition of the facility from a minor to a major source of HAPs, it was determined, pursuant to §45-13-4.1(a), that the permitting action was ineligible for a Class II Administrative Update and would require review as a modification. 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 18, 2017 in the *Moundsville Daily Echo* and the affidavit of publication for this legal advertisement was submitted on January 26, 2017 .

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

The Moundsville Fractionation Plant 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 Moundsville Extraction and Fractionation Plant is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under 45CSR14.

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. The Moundsville Fractionation Plant, defined under Title V as a "major source," was last issued a Title V renewal permit on November 10, 2015 (R30-05100141-2015). Proposed changes evaluated herein must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

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 Moundsville Fractionation Plant 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 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.

Leak Detection and Repair Requirements (LDAR)

The substantive requirement under Subpart OOOO for affected facilities at a natural gas processing plant is to meet the applicable LDAR conditions under 40 CFR 60, Subpart VVa. The Moundsville Fractionation Plant 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. The substantive requirements are, for streams with a VOC content greater than 10%, a 500 ppm detection level on valves and connectors in gas and light-liquid service, and monthly monitoring (quarterly if no leak is detected for 2 months).

Subpart OOOOa: Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 - (NON APPLICABILITY)

The applicable provisions of Subpart OOOOa apply if the affected facilities were constructed or modified after September 18, 2015. According to OVM, the components contributing to the revised fugitive emissions emission rate calculated as part of this modification were not constructed or modified (as defined under 40 CFR 60) after September 18, 2015.

40 CFR 63 Subpart HH: National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities - (PARTIAL APPLICABILITY)

40 CFR 63, Subpart HH is a federal maximum achievable control technology (MACT) rule that establishes emission limitations and work practice standards for HAPs emitted from Oil and Natural Gas Production Facilities. Specifically, the MACT targets emissions from storage tanks, glycol dehydration units (GDUs), and equipment leaks. Pursuant to §63.766(d) and §63.769(b), respectively, storage vessels and equipment leaks that are regulated under 40 CFR 60, Subpart OOOO are not subject to the requirements under 40 CFR 63, Subpart HH. The facility does not include a GDU. However, some minor reporting requirements remain applicable under §63.775(e).

40 CFR 63 Subpart DDDDD: National Emission Standards for Hazardous Air Pollutants for Hazardous Air Pollutants Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters

40 CFR 63, Subpart DDDDD is a federal MACT rule that establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAPs. As a result of the changes proposed herein, the Moundsville Fractionation Plant became a major source of HAPs (n-Hexane PTE exceeds 10 TPY). Therefore, applicability to Subpart DDDDD is now reviewed.

Pursuant to §63.7485, Subpart DDDD applies to "an industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is part of, a major source of HAPs." As noted, the Moundsville Fractionation Plant is defined as a major source of HAPs. Therefore, OVM's two (2) existing 89.85 mmBTU/hr Hot Oil Heaters (2-HTR) are subject to

Subpart DDDDD (defined as p"process heaters" under §63.7575). The Hot Oil Heaters are not, however, pursuant to §63.7500(e) subject to any emission standards: "Boilers and process heaters in the units designed to burn gas 1 fuels subcategory [includes natural gas] are not subject to the emission limits in Tables 1 and 2 or 11 through 13 to this subpart, or the operating limits in Table 4 to this subpart." However, the units are subject to the applicable testing, analysis, initial compliance, notification, reporting, and record-keeping requirements §63.7500-§63.7560.

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the Moundsville Fractionation Plant 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 Moundsville Fractionation Plant has the potential to emit the following HAPs as in substantive amounts (> 100 lbs/year): Formaldehyde, n-Hexane, Benzene, Toluene, Ethylbenzene, and Xylenes. 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
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

There was no changes to substantive monitoring, compliance demonstration, and record-keeping requirements.

PERFORMANCE TESTING OF OPERATIONS

There were no changes to performance testing requirements.

CHANGES TO R13-2892D

The following substantive changes were made to Permit Number R13-2892D:

- The Emissions Units Table 1.0 was revised to reflect the changes in the "Year Installed" of various equipment and the size and number of pressurized storage tanks (3S);
- Requirement 4.1.2. limiting the facility to less than major source status for HAPs was removed from the permit;
- The VOC fugitive emission rate from 1S was revised under 7.1.3 of the draft permit; and
- General applicability for 40 CFR 63, Subpart HH and Subpart DDDDD were added to Sections 9.0 and 10.0 of the permit.

RECOMMENDATION TO DIRECTOR

The information provided in permit application R13-2892E indicates that compliance with all applicable federal and state air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R13-2892E to Williams Ohio Valley Midstream, LLC for the modifications discussed herein at the Moundsville Fractionation Plant located in Moundsville, Marshall County, WV.

Joe Kessler, PE
Engineer

2/13/14
Date

Attachment A: Facility-Wide PTE

Williams Ohio Valley Midstream, LLC: Moundsville Fractionation Plant

Permit Number R13-2892E: Facility ID 051-00141

Emission Unit	EP ID	CO		NO_x		PM[1]		SO_x		VOC		n-Hexane		Total HAPs	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Hot Oil Heater 1	1E	3.75	16.43	4.46	19.56	0.34	1.49	0.03	0.12	0.25	1.08	0.08	0.35	0.08	0.37
Hot Oil Heater 2A	2E	6.65	35.00	3.23	17.03	0.67	3.52	0.05	0.28	0.36	1.89	0.16	0.83	0.17	0.88
Hot Oil Heater 2B		6.65		3.23		0.67		0.05		0.36		0.16		0.17	
Flare Combustion Exhaust	5E	170.81	84.46	85.56	42.31	1.48	0.73	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Flare Pass-Through Emissions		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	280.00	140.06	11.23	5.83	14.28	7.41
Non-Pressurized Storage Tanks	TKS2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.40	0.02	0.09	0.02	0.10
Emergency Generator	6E	41.98	10.49	1.08	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fractionation Plant Fugitives	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.54	68.08	1.08	4.72	1.34	5.85
Misc. Equipment Leaks	n/a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.02	4.02	0.00	0.00	0.00	0.00
Facility-Wide Total →		***229.84***	***146.38***	***97.56***	***79.17***	***3.16***	***5.74***	***0.25***	***0.46***	***301.40***	***215.53***	***12.73***	***11.82***	***16.06***	***14.61***
Facility-Wide PTE[3] →		***229.84***	***146.38***	***97.56***	***79.17***	***3.16***	***5.74***	***0.25***	***0.46***	***281.84***	***143.43***	***12.73***	***11.82***	***16.06***	***14.61***

(1) All particular matter emissions are assumed to be 2.5 microns or less.

(2) PTE does not include fugitive emissions. No individual HAP has a PTE over 10 TPY (n-Hexane is the largest contributor). As the PTE of all individual HAPs are less than 10 TPY the PTE of total HAPs is less than 25 TPY, and the PTE of each criteria pollutant is less than 100 TPY, the Moundsville Fractionation Plant is defined as a minor (area) source for purposes of 40 CFR 61, 40CFR63, and Title V.