

**COMMONWEALTH OF PENNSYLVANIA**  
**Department of Environmental Protection**  
**Southwest Regional Office**

**MEMO**

**TO** Air Quality Permit File GP5-63-01011B (AG5-63-00011A)

**FROM**

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Air Quality Program

**THROUGH** Mark R. Gorog, P.E./MRG                      Edward F. Orris, P.E./MRG for EFO  
Regional Program Manager                      NSR Section Chief  
Air Quality Program                                      Air Quality Program

**DATE**                      **June 29, 2022**

**RE**                      Review of General Permit Application – Re-Authorization With Modification  
MarkWest Liberty Midstream & Resources, L.L.C.  
Harmon Creek Gas Plant  
Smith Township, Washington County  
APS 1029255 Auth 1337535 PF 819388

**Background**

On December 10, 2020, the Department received a general permit re-authorization with modification application from MarkWest Liberty Midstream & Resources, L.L.C. (MarkWest) for the Harmon Creek Gas Plant (Harmon Creek) located at 123 Point Pleasant Road, Bulger, PA 15019 in Smith Township, Washington County. Currently, the facility is operating under GP5-63-01011A and GP1-63-01011A, both of which were issued on January 17, 2018. This new application proposes to incorporate the five (5) heaters, currently operating under GP1-63-01011A, into the GP5 permit as well as modify the maximum heat input ratings for six (6) heaters. A Request for Determination (RFD) regarding the Amine Unit, Closed Drain Tank, and increase of processing capacity of cryogenic processing plants was submitted to the Department on January 6, 2020; this RFD will also be reviewed within this review memo.

The Department sent MarkWest technical deficiencies on February 23, 2021 and October 7, 2021. Responses were received on March 5, 2021 and November 11, 2021, respectively. The Department performed a site visit on May 4, 2021; information requested during the site visit was received on May 19, 2021, June 1, 2021, and June 16, 2021. On January 4, 2022, the Department sent MarkWest a pre-denial letter for the GP-5 application and received a response on February 2, 2022. On April 20, 2022, the facility was inspected by AQS Steve Mieszkowski and Air Quality Program Manager Mark Gorog in order to assess the status of construction at the facility. On May 4, 2022, the Department sent MarkWest a notice of termination of construction authorization. All deficiencies, responses, and letters were sent via email.

On January 17, 2018, GP5-63-01011A was authorized to construct and operate:

- Two (2) 200 MMscf/d Cryogenic Processing Plants
- One (1) De-Ethanization Fractionation Plant
- One (1) 8,134 MMBtu/hr plant flare
- Ten (10) 5,000 hp electric driven reciprocating compressors (rod packing emissions)
- Fugitive emissions from component leaks

On January 17, 2018, GP1-63-01011A was authorized to construct and operate:

- Two (2) 10.25 MMBtu/hr natural gas-fired Tulsa Heaters cryo mol sieve regen heaters
- Two (2) 41.22 MMBtu/hr natural gas-fired Scelerin Heaters de-ethanzation HMO heaters
- One (1) 10.37 MMBtu/hr natural gas-fired Tulsa Heaters stabilization HMO heater

Per a letter from MarkWest, dated April 17, 2020 and follow-up site inspections on September 16, 2021 and April 20, 2022, the following equipment has not been installed at the facility, and a lapse in construction of 18 months has occurred:

- Harmon Creek 2 - 200 MMscf/d Cryogenic Processing Plant
- One (1) Cryo Mol Sieve Regen Heater (H-2711) Covered in GP-1
- Three (3) 5,000 HP Electric Driver Reciprocating Compressors

This GP-5 application will include reviewing the constructed equipment listed below. MarkWest has indicated that a Plan Approval application will be submitted for the unconstructed equipment.

Equipment permitted under GP5-63-01011B:

- One (1) Cryogenic Processing Plant – Increased Capacity from 200 mmscfd to 230 mmscfd
- One (1) De-Ethanization Fractionation Plant
- Cryo Plant 1 Regen Heater (Source ID 031): Increased Capacity from 10.25 MMBtu/hr to 11.84 MMBtu/hr
- Cryo Plant 1 De-Ethanizer HMO Heater (Source ID 033): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Cryo Plant 2 De-Ethanizer HMO Heater (Source ID 034): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Stabilization HMO Heater (Source ID 036): Increased Capacity from 10.37 MMBtu/hr to 11.99 MMBtu/hr
- Process Flare (Source ID C601): 8,134 MMBtu/hr; 126.52 MMscf/yr
- Fugitives Emissions (Source ID 701) (Including truck loading and measurement devices)
- Four (4) Pig Launchers controlled by the plant flare (Source ID 801)
- One (1) Pig Receiver controlled by the plant flare (Source ID 801)
- Seven (7) electric driven reciprocating compressors ranging from 75-5,000 hp (rod packing emissions) (Source ID 601)<sup>1</sup>

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<sup>1</sup> One (1) 75 hp compressor, Two (2) 900 hp compressors, Four (4) 5,000 hp compressors

Plan Approval Exempt Sources:

- Generac SD015 (Source ID 102): 49 bhp
- Generac SD150 (Source ID 102): 279 bhp
- De-Ethanizer Regen Heater (Source ID 035): Modified from 5.79 MMBtu/hr to 6.60 MMBtu/hr
- Amine Unit and Closed Drain Tank (routed to flare) (exempted per this authorization)
- Measurement Devices (exempted per this authorization)

Other Equipment included within this review:

- Methanol Tanks (Source ID 301) – Existing Source
- 4,200 Amine storage tank (Source ID 301) – Insignificant Existing Source

**Fee:**

MarkWest provided the Department with \$375 for the application which covers the General Operating Permit Application Fee.

**Municipal Notification:**

The applicant has submitted proof of submittal of municipal notifications to the County and the Municipality per Condition 11 of Section A of GP-5. Both notifications were received by the County and Municipality on December 3, 2020, and December 4, 2020, respectively.

**RFD Determination:**

On January 6, 2020, the Department received an RFD application for Harmon Creek requesting for the existing amine unit and drain tank to be exempted as well as exemption of the capacity increase of the cryogenic processing plants. This review will consider only the operating cryogenic processing plant because the second cryogenic processing plant has not been constructed.

Typically, the purpose of an amine unit is to sweeten sour gas. The existing amine unit at Harmon Creek was not designed to sweeten gas. The purpose of the amine unit is to remove CO<sub>2</sub> from the ethane stream and reinject into the residue gas pipeline. No emissions are associated with the amine unit. In the event of the CO<sub>2</sub> compressor failing and discharging to the atmosphere, MarkWest does not expect any reportable emissions to be emitted since VOCs are not contained in the purity ethane stream. There is an associated 4,200 closed drain tank and 1,430 gallon amine tank that are operated and routed to the flare. MarkWest explained that the tanks route to the flare and when the flare is down the gas stream stays within the tanks. The Department has determined that the amine unit, including the associated two tanks, are exempt from plan approval requirements per 25 Pa. Code §127.14(d) listed as No. 44 in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8). During the site visit on May 4, 2021, MarkWest explained that the vessels are process vessels and not storage vessels. Process vessels are not subject to 25 Pa. Code §129.57 or 40 CFR 60 Subpart OOOOa.

Currently, the existing cryogenic processing plant at the facility is permitted with a nominal capacity of 200 MMscf/day. The RFD application explained that depending on certain variables, and for certain periods of time, the plant has the potential to process up to 230 MMscf/day. The emission sources for the cryogenic processing are fugitive components and heaters, and the heaters are permitted for maximum heat throughput. Although actual emissions may increase by 10%, PTE does not increase due to the capacity increase. MarkWest further clarified as follows, “*there are no potential emission increases associated with the increased capacity at the plant. Heater duties may increase due to the increased capacity, however, MarkWest conservatively reports actual emissions based on the maximum heater ratings from the manufacturer. Additionally, MarkWest conducts routine LDAR monitoring at the facility and upon detecting a leak, the leak is repaired as required. Therefore, fugitive emissions would not be expected to increase.*” The Department has determined that the capacity increase did not trigger any new requirements under GP-5.

The measurement devices at the facility have a potential to emit 0.78 tpy of VOC and 0.06 tpy of total HAPs. The Department has determined that the measurement devices may be exempt from plan approval requirements per 25 Pa. Code §127.14(a)(7) in the Department's Plan Approval and Operating Permit Exemptions list however the emissions from this source have been evaluated in this analysis.

### **Regulatory Analysis:**

The facility is subject to all the applicable requirements of GP-5 and GP-1 for existing sources which were authorized via a previously issued GP-5 and GP-1. See the attached “previous memo” for GP5-63-01011A and GP1-63-01011A, each authorized on January 17, 2018, for federal regulatory applicability.

#### **GP-5 Section B – Requirements for Glycol Dehydration Units.**

There are no glycol dehydration units proposed or existing at this facility.

#### **GP-5 Section C – Requirements for Stationary Natural Gas-Fired Ignition Internal Combustion Engines**

There are no applicable requirements under this section since there are no natural gas-fired engines proposed.

#### **GP-5 Section D – Requirements for Reciprocating Compressors**

Per GP-5 Section A Condition 3<sup>2</sup>, a *reciprocating compressor* is “a piece of equipment that increases the pressure of a process gas by positive displacement, employing linear movement of the driveshaft” as referenced in §60.5430a. There are seven (7) existing electrically driven reciprocating compressors operating at the facility, and no modification is proposed. Currently, these compressors are permitted per the GP-5 conditions dated January 2015 (2700-PM-BAQ0205). Within this version of conditions, only natural gas compressors were applicable to GP-5 conditions. Per the current GP5 conditions, dated June 2018 (270-PM-BAQ0267), all reciprocating compressors are subject to Section D regardless of fuel type and installation date.

Per Section D Condition 1 referring to 40 CFR §60.5385a, Harmon Creek must either replace the reciprocating compressor rod packing either on or before 26,000 hours of operation or prior to 36 months from the initial startup date or most recent rod packing replacement; or collect the methane, VOC, and HAP emissions from the rod packing using a collection system that meets the applicable requirements of Section J.

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<sup>2</sup> Incorporates the definitions established in 40 CFR Part 60 Subpart OOOOa, by reference.

Per Section D Condition 2 referring to 40 CFR §60.5420(c)(3) and 40 CFR §60.5420a(c)(3), Harmon Creek must keep the following records for each reciprocating compressor: cumulative hours or numbers of months since the initial startup; 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 with the requirements specified in §60.5385 or §60.5385a as applicable.

Per Section D Condition 3, The emissions from each reciprocating compressor operating during the reporting period must be included in the emissions inventory report of Section A Condition 13(d), including the emissions from scheduled and unscheduled blowdowns.

#### **GP-5 Section E – Requirements for Storage Vessels.**

The 500 gallon methanol tank is expected to emit no more than 0.169 tpy of both VOC and HAPs and is not subject to Section E. During a meeting on June 14, 2022, MarkWest stated that analysis was performed on the 4,200 gallon Amine + DI water storage tank and emissions were expected to be insignificant. The emissions from this tank is expected to be insignificant, and is not subject to Section E.

#### **GP-5 Section F – Requirements for Tanker Truck Load-Out Operations.**

Per Section F(1)(a), “For all truck load-out operations that service a storage vessel with a methane emission rate of 200 tpy or greater, a VOC emission rate of 2.7 tpy or greater, a single HAP emission rate of 0.5 tpy or greater, or a total HAP emission rate of 1.0 tpy or greater, where the loading rack was constructed and authorized to operate on or after August 8, 2018, the owner or operator shall...” There are tanker truck load-out operations associated with the drain tank that MarkWest has indicated to be a process vessel and not a storage vessel. The truck loadout associated with the process vessel is not subject to Section F 1(a).

#### **GP-5 Section G – Requirements for Fugitive Emissions Components.**

The facility is now subject to the following LDAR requirements of Section G of GP5 issued on June 2018. Because the only modification under this GP-5 application is the increase in capacity for the heaters, and is not a physical modification, the components are subject to Section G(1)(a).

Components approved by the Department on or after February 2, 2013, but prior to August 8, 2018.

For any fugitive emission components at the facility constructed and authorized to operate under GP-5 approved by the Department on or after February 2, 2013 but prior to August 8, 2018 are now subject to Section G 1(1)(a) conditions. Requirements include monthly audible, visual, and olfactory (AVO) inspections as well subsequent quarterly leak detection using a forward looking infrared (FLIR) camera on other leak detection monitoring device approved by the Department for the detection of fugitive leaks.

According to the response to questions 4 and 5 of Department’s FAQ – Implementation of GP-5 and Exemption No. 38<sup>3</sup>, “DEP considers a “leak” as any release of gaseous hydrocarbons that is determined by Audible, Visual, and Olfactory (“AVO”) inspection, which is required to be performed on a monthly basis by GP-5 Section G Condition 1(a). DEP also considers a “leak” as any release of gaseous hydrocarbons that will be detected by a

<sup>3</sup> [http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/Permits/gp/FAQ\\_GP-5\\_AND\\_EXEMPTION\\_CATEGORY\\_NO\\_38.pdf](http://files.dep.state.pa.us/Air/AirQuality/AQPortalFiles/Permits/gp/FAQ_GP-5_AND_EXEMPTION_CATEGORY_NO_38.pdf)

Forward Looking Infrared (FLIR) camera or any gas leak detection device, which is required to be used on a quarterly basis under GP-5.

If any leak is detected, the operator shall repair the leak as expeditiously as practicable, but no later than fifteen (15) days after the leak is detected, except as provided in 40 CFR § 60.482-60.489. The operator shall record each leak detected and the associated repair activity. These records shall be retained for a minimum of five (5) years and shall be made available to the Department upon request.

Per Section G Condition 2, the owner or operator shall maintain records in accordance with Section A Condition 12 of the GP5 conditions. This includes the fugitive emissions monitoring plan in accordance with 40 CFR §60.5397a(b) through (d). Records of each monitoring survey which must include the facility name and location; the GP-5 authorization number; the date, start time, and end time of the survey; the name of the operator(s) performing the survey; the monitoring instrument used; the ambient temperature, sky conditions, and maximum wind speed at the time of the survey; any deviations from the monitoring plan or a statement that there were none. Records of each fugitive emission documented shall include the identification of each component from which fugitive emissions were detected and the instrument reading of each fugitive emissions component that meets the leak definition in Section G Condition 1(b)(iv)(C). Records of the status of each component repair shall include the repair methods applied; the tagging or digital photographing of each component not repaired during the monitoring survey in which the fugitive emissions were discovered; justification for any delay of repair; the date of successful repair of the component; and method used to resurvey the component after repair, if it was not completed during the monitoring survey in which the fugitive emissions were discovered.

Per Section G Condition 1(c), the Department has determined that the VOC and methane emissions remaining after the implementation of BAT requirements, including LDAR, are of minor significance with respect to causing air pollution, and will not, on their own, be preventing or interfering with the attainment or maintenance of an ambient air quality standard.

MarkWest meets BAT by implementing a LDAR program that performs AVO inspections per shift, monthly Method 21 monitoring of pumps, and quarterly Method 21 monitoring of other component types. In addition, Harmon Creek also implements the boilerplate conditions from the Texas Commission on Environmental Quality (TCEQ) 28VHP LDAR program which includes welded or flanged piping connections.

**GP-5 Section H – Requirements for Natural Gas-Driven Pneumatic Controllers.**

There are no natural gas driven pneumatic controllers proposed or existing at this facility. All pneumatic devices are air-driven.

**GP-5 Section I – Requirements for Natural Gas-Driven Pneumatic Pumps**

There are no natural gas driven pneumatic pumps proposed or existing at this facility. All pneumatic devices are air-driven.

**GP-5 Section J – Requirements for Enclosed Flares and Other Emission Control Devices**

There are no enclosed flares or other enclosed combustion control devices proposed or existing at this facility.

This facility operates an existing 8,134 MMBtu/hr open flare which was proposed in the original GP-5 application under the 2015 version of the GP-5. Under the 2015 version of the GP-5 conditions, open flares were not prohibited. Under the current 2018 GP-5 conditions, Section J states *“The Department may allow open flares at remote locations and for infrequent operations, provided the flare is installed and operated consistent with 40 CFR § 60.18.”*

On October 7, 2021, the Department requested a demonstration from MarkWest that the facility does not have a footprint for an enclosed flare. On November 11, 2021, MarkWest submitted the following demonstration, *“MarkWest did not consider an enclosed flare during the design of the Harmon Creek facility. The standard MarkWest engineering design for cryogenic and deethanizer plants is an air-assisted flare.”*

Per the Comment and Response Document (Part 1 of 2), finalized in June 2018, the Department responded to comments regarding open and enclosed flares.

Response to Comment 400 – *“The revised general permits allow the operation of open flare; however, all permanent flaring operations must be enclosed.”*

Response to Comment 402 – *“Only new or modified permanent flaring operations are required to be enclosed. The Department has required enclosed flares for permanent flaring operations at well sites since August 10, 2013.”*

It is the Department’s understanding that all permanent flaring operating at a facility permitted under GP-5 shall be enclosed, with a few exceptions. An open flare is permitted if it meets one of the following criteria:

1. The open flare was previously authorized under an older version of the GP-5 and is not modified.
2. It is operated at a remote location
3. It is infrequently operated

The Department as compared the existing open flare to the three bullet points above.

**1. Was open flare was previously authorized under an older version of the GP-5? Is it being modified under this application?**

Per 25 Pa. Code Section 121.1, the definition of a modification is as follows:

*“A physical change in a source or a change in the method of operation of a source which would increase the amount of an air contaminant emitted by the source or which would result in the emission of an air contaminant not previously emitted, except that routine maintenance, repair and replacement are not considered physical changes. An increase in the hours of operation is not considered a modification if the increase in the hours of operation has been authorized in a way that is Federally enforceable or legally and practicably enforceable by an operating permit condition.”*

The existing open flare was originally authorized on January 17, 2018 under the 2015 version of GP-5 conditions. Per this application, no new or existing sources, that are routed to the flare, are being

modified. Because of this, and because the flare is not being physically modified, the flare is not considered to be modified.

### **GP-5 Section K – Requirements for Pigging Equipment**

Within the review memo for this facility, dated January 12, 2018, an exemption determination was made for two (2) high-pressure pig launchers and three (3) high-pressure pig receivers, all of which are controlled by the plant flare. It was observed in this application that the facility has four (4) pig launchers that are 12”, 10”, 20”, and 24” in size as well as one (1) 20” pig receiver. On March 5, 2021, MarkWest confirmed that the only launchers and receivers at Harmon Creek are the ones indicated in the application and that the previous sizes were estimates. The previous equipment indicated in the January 12, 2018 exemption determination were based on estimates.

Although previously exempted, the current GP-5 conditions apply to all pigging equipment regardless of installation date. Per Section K(1)(a-b), The owner or operator that conducts pigging operations shall employ best management practices to minimize the liquids present in the pig receiver chamber and to minimize emissions from the pig receiver chamber including, but not limited to, installing liquids ramps, installing liquids drain, routing high-pressure chambers to a low-pressure line or vessel, using ball valve type chambers, or using multiple pig chambers. The selection of the appropriate best management practices must be documented in the application. (b) For pigging operations with a methane emission rate of 200 tpy or greater, or a VOC emission rate of 2.7 tpy or greater, or a single HAP emission rate of 0.5 tpy or greater, or a total HAP emission rate of 1.0 tpy or greater, after employing best management practices, the owner or operator shall control methane, VOC, and HAP emissions from all pigging operations by at least 95% with a condenser, flare, thermal oxidizer, vapor recovery unit, or other air cleaning device, or any alternative method approved by the Department that meets the applicable requirements in Section J.

The launchers and receivers route to the existing flare and utilize pig ramps all of which meet GP-5 conditions.

### **GP-5 Section L – Requirements for Natural Gas-fired Combustion Units**

Four (4) of the five (5) combustion units at Harmon Creek (Source ID 031, 033, 034, and 036) currently operate under GP1-63-01011A, and the remaining combustion unit (Source ID 035) was exempted from plan approval and operating permit per RFD-63-01011A. Both the GP1 and RFD were authorized before August 8, 2018. This application is proposing to increase the heat input for each of the six combustion units which results in each of the units being subject to Section L(1)(a). Sources 031, 033, 034, and 036 are also subject to Section L(1)(b) and will be subject to performance testing. For sources 031 and 036, the provided specification sheets did not provide the emission limits for NO<sub>x</sub> or CO. MarkWest provided results from multiple stack test report for 031 and 036. Per Section L(b)(i), emission limits for NO<sub>x</sub> is 30 ppmvd @ 3% O<sub>2</sub> and for CO is 130 ppmvd @ 3% O<sub>2</sub>. The provided stack tests were performed at 15% O<sub>2</sub>. Performance testing for natural gas-fired combustion units is required within 180 days of initial startup for new sources and within 180 days of reauthorization. MarkWest will need to test NO<sub>x</sub> and CO during the performance testing @ 3% to show compliance with the NO<sub>x</sub> and CO emission limits.



## **GP-5 Section M – Requirements for Stationary Natural Gas-Fired Combustion Turbines**

There are no natural-gas fired combustion turbines indicated in this application.

## **GP-5 Section N – Requirements for Centrifugal Compressors**

There are no centrifugal compressors proposed indicated in this application or in past memos.

### **Federal Regulatory Analysis:**

The facility is subject to all the applicable requirements of GP-5 for existing non-modified sources which were authorized via a ‘previously issued GP-5’. See the attached “previous memo” of GP5-63-01011A, authorized on January 17, 2018, for federal regulatory applicability.

### **Regulatory Analysis**

**New Source Performance Standards (NSPS) from 40 CFR 60 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** does *not* apply to this facility. Per 40 CFR 60.110b(a), “the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (19,813 gallons) that is used to store volatile organic liquids for which construction, reconstruction, or modification is commenced after July 23, 1984”. There are no storage vessels at this facility with a capacity greater than or equal to 19,813 gallons; therefore, this subpart does not apply.

**NSPS from 40 CFR Part 60 Subpart KKK —Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011** does *not* apply to this facility since it was not constructed on or before August 23, 2011.

**NSPS from 40 CFR Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition (SI) Internal Combustion Engines (ICE)** applies to manufacturers, owners, and operators of stationary spark ignition engines as specified in §60.4230 (a)(1) through (a)(6). Per the attached previous memo, the facility is not subject to this subpart since the reciprocating compressors are electrically driven with electricity supplied from the grid.

**National Emission Standards for Hazardous Air Pollutants (NESHAPS) from 40 CFR Part 63 Subpart HH - Oil and Natural Gas Production Facilities** does not apply to the tanks at this facility. Per 40 CFR 670(b)(2), for area sources, this subpart only applies to the owners and operators of TEG dehydration units, and this facility does not have any TEG dehydration units.

**NESHAPS from 40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines (RICE)** Per the attached previous memo, the facility is not subject to this subpart since the reciprocating compressors are electrically driven with electricity supplied from the grid.

**NSPS from 40 CFR Part 60 Subpart OOOO—Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after August 23, 2011, and on or before September 18, 2015** will not apply to the facility since it was constructed after September 18, 2015.

**40 CFR Part 60 Subpart OOOOa—Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015** became effective on August 2, 2016, and established emission standards and compliance schedules for the control of greenhouse gases (GHG), volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected onshore affected facilities listed in §60.5365(a–j) in the crude oil and natural gas source category that commence construction, modification, or reconstruction after September 18, 2015. For the purposes of 40 CFR Part 60, *construction* means the “fabrication, erection, or installation of an affected facility.” Per §60.5370a(a), owners and operators of affected facilities must be in compliance with the standards of Subpart OOOOa no later than August 2, 2016, or upon startup, whichever is later. According to §60.5370a(b), at all times, including periods of startup, shutdown, and malfunction, owners and operators shall maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator [the Department] which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of source(s). The provisions for exemption from compliance during periods of startup, shutdown and malfunctions provided for in 40 CFR §60.8(c) do not apply to this subpart. Applicability of Subpart OOOOa to any potentially affected facilities at Harmon Creek discussed below.

#### *Reciprocating Compressors*

By definition in §60.5430a, a *reciprocating compressor* is “a piece of equipment that increases the pressure of a process gas by positive displacement, employing linear movement of the driveshaft.” Per §60.5365(c), each *reciprocating compressor* affected facility is a single reciprocating compressor. The existing reciprocating compressors are Subpart OOOOa-affected facilities.

In accordance with 40 CFR §60.5385a, Harmon Creek must either replace the reciprocating compressor rod packing either on or before 26,000 hours of operation or prior to 36 months from the initial startup date or most recent rod packing replacement, whichever is later, or collect the methane and VOC emissions from the rod packing using a rod packing emissions collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of §60.5411a(a) and (d).

Per 40 CFR §60.5420a(c)(3), Harmon Creek must keep the following records for the reciprocating compressor: cumulative hours or numbers of months since the initial startup; 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 with the requirements specified in §60.5385a.

#### *Pneumatic Controllers*

There were no proposed natural gas driven pneumatic controllers indicated within this application.

### *Storage Tanks/Storage Vessels*

The facility does not operate storage vessels that have potential to meet or exceed 6 tpy of VOC of emissions.

### *Pneumatic Pumps*

There were no proposed natural gas driven pneumatic pumps indicated within this application.

Per §60.5430a, *a sweetening unit is defined as:*

“...Sweetening unit means a process device that removes hydrogen sulfide and/or carbon dioxide from the sour natural gas stream.”

Per 40 CFR 60.5365a(g)(3), sweetening units located at a natural gas processing plant that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H<sub>2</sub>S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423a(c) but are not required to comply with the control requirements of §§60.5405a through 60.5407a and §§60.5410a(g) and 60.5415a(g) of this subpart. The existing amine unit at this facility removes CO<sub>2</sub> from the gas, not H<sub>2</sub>S. H<sub>2</sub>S emissions are dependent upon the sulfur content of the gas. The most recent analysis did not detect H<sub>2</sub>S and therefore insignificant or no H<sub>2</sub>S emissions are expected. In accordance with §60.5423a(c), “To certify that a facility is exempt from the control requirements of these standards, for each facility with a design capacity less than 2 LT/D of H<sub>2</sub>S in the acid gas (expressed as sulfur) you must keep, for the life of the facility, an analysis demonstrating that the facility's design capacity is less than 2 LT/D of H<sub>2</sub>S expressed as sulfur.”

### *Fugitive Emission Components*

Per the attached review memo for GP5-63-01011A:

“Subpart OOOOa...will apply to the fugitive emission components at the proposed processing plant. Per 40 CFR §60.5365a(f), the group of all equipment within a process unit is considered an affected facility. Per 40 CFR §60.5430a, “Process unit means components assembled for the extraction of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products...”

The proposed project will include equipment to extract natural gas liquids from field gas (cryogenic plants and de-ethanizer), therefore the site will be considered a gas processing plant subject to the leak detection and repair (LDAR) requirements of this subpart.

MarkWest will be required to monitor and repair all fugitive emissions from proposed components. NSPS Subpart OOOOa adopts several of the provisions from NSPS Subpart VVa with additional exemptions and requirements. Subpart VVa establishes leak definitions and monitoring frequencies for equipment, monitoring procedures in accordance with Method 21 or sensory monitoring, repair requirements for leaking equipment, and resurvey of equipment to ensure successful repair. Associated recordkeeping and reporting using EPA’s Compliance and Emissions Data Reporting Interface also applies.”

## **Emissions and Controls:**

Facility-wide potential to emit calculations were carried out by the applicant for all sources. Routine blowdowns are routed to the existing flare and tracked by the flow meter on the flare.

The flare is rated at 8,134 MMBtu/hr. With this application, MarkWest is proposed an annual flare capacity of 126.52 MMscf/yr (100 MMscf/yr from hydrocarbon combustion and 26.52 MMscf/yr from pilot + purge).

On October 7, 2021, the Department provided standard methanol usage questions to MarkWest. On November 11, 2021, MarkWest provided revised emission estimates to include methanol usage. Per a June 3, 2021, inlet gas analysis, no methanol was detected. Methanol emission estimates were based on 50 gallons of annual usage, but MarkWest explained that no more than five gallons are utilized per year. Methanol is used periodically throughout the year when needed, and it is injected from the injection pump then routed to the DeMethanizer.

As requested, MarkWest provided emission estimates for measurement devices (analyzers and gas chromatography vents). Estimates are included below, but the Department has determined that the measurement devices may be exempted from Plan Approval per 25 Pa. Code Section 127.14(a) number 7, "Laboratory equipment used exclusively for chemical or physical analyses."

For fugitive emissions, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995 was utilized for emission factors. In addition, MarkWest implements the TCEQ 28VHP LDAR program with reductions found in APDG 6422v2, Revised 06/2018. The LDAR program implemented requires quarterly monitoring of components and welded or flanged connections. TCEQ estimated the reductions based on the average difference between Table 2.4 and Table 2.5 in the EPA 453/R-95-017, November 1995 document. The 28VHP Program includes boilerplate conditions that an operator must follow in order to claim the 28VHP reduction factors. This includes construction of both new and reworked piping, valves, pump systems, and compressor systems conforming to applicable codes and for piping connections to be welded or flanged. Per construction documentation provided by MarkWest, the facility was constructed in accordance with AWS D1.1 which specifies welding code. By following code, and by welding and flanging piping to certain standards (with the exception of screwing connections for piping less than 2 inch diameter), the Department acknowledges the 28VHP program for the Harmon Creek facility. By welding instead of screwing a connection together, the weld theoretically removes the connections and forms one pipe. In addition, MarkWest will follow the GP-5 BAT definition of fugitive leak for all components of 500 ppm. Similar to 25 Pa. Code §121.1, Lowest Achievable Emission Rate (LAER) is defined as "*The most stringent emission limitation which is contained in the implementation plan of a state for the class or category of source unless the owner or operator of the proposed source demonstrates that the limitations are not achievable.*" In this similar situation of BAT, the 28VHP program, along with the leak definition of 500 ppm, the LDAR program proposed by MarkWest is stringent and may be accepted for this application.

### Facility-wide Potential to Emit

Source	NO <sub>x</sub>		CO		VOC		SO <sub>x</sub>		PM <sub>10</sub>		Total HAP		CO <sub>2</sub> e
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	tpy
Cryo Plant 1 Regen Heater (Source ID 031)	0.47	2.07	0.47	2.07	0.22	0.98	0.01	0.03	0.15	0.67	0.02	0.10	6857
Cryo Plant 1 De-Ethanizer HMO Heater (Source ID 033)	1.93	8.44	1.93	8.44	0.91	4.01	0.03	0.12	0.63	2.74	0.09	0.39	27893
Cryo Plant 2 De-Ethanizer HMO Heater (Source ID 034)	1.93	8.44	1.93	8.44	0.91	4.01	0.03	0.12	0.63	2.74	0.09	0.39	27893
Stabilization HMO Heater (Source ID 036)	0.48	2.10	0.48	2.10	0.23	1.00	0.01	0.03	0.16	0.68	0.02	0.10	6946
De-Ethanizer Regen Heater (Source ID 035)	0.26	1.16	0.26	1.16	0.13	0.55	0.00	0.02	0.09	0.38	0.01	0.05	3824
Process Flare (Source ID C601)	1.23	5.39	5.61	24.56	3.07	13.46	0.01	0.04	0.11	0.50	0.22	0.98	10622
Generac SD015 (Source ID 102)	0.26	0.07	0.14	0.04	0.08	0.02	0.10	0.03	0.02	0.01	0.00	0.00	15
Generac SD150 (Source ID 102)	1.31	0.33	0.55	0.14	0.41	0.10	0.10	0.03	0.04	0.01	0.01	0.00	76
Fugitives Emissions (Source ID 701)	--	--	--	--	--	6.77	--	--	--	--	--	0.31	226
Pigging (Source ID 801)	--	--	--	--	--	--	--	--	--	--	--	--	--
Rod Packing (Source ID 601)	--	--	--	--	0.25	1.11	--	--	--	--	0.00	0.01	1823
Truck Loading	--	--	--	--	--	--	--	--	--	--	--	--	--
Methanol Tanks	--	--	--	--	0.04	0.18	--	--	--	--	0.04	0.18	--
Measurement Devices	--	--	--	--	0.18	0.78	--	--	--	--	0.01	0.06	63
<b>total</b>	<b>7.87</b>	<b>28.0</b>	<b>11.37</b>	<b>46.95</b>	<b>6.43</b>	<b>32.97</b>	<b>0.29</b>	<b>0.42</b>	<b>1.83</b>	<b>7.73</b>	<b>0.51</b>	<b>2.57</b>	<b>86238</b>

1. Emissions are based on 8,760 hours of operation.
2. Pigging and truck loading emission estimates found within Source ID C601 emission estimates.
3. The Department corrected PM<sub>10</sub> emission estimates for Sources 031-035 to be based on manufacturer's guarantees.
4. The Department corrected VOC and CO<sub>2</sub>e emission estimates for Source ID 601 – CO<sub>2</sub> compressors.
5. Assumes that PM<sub>10</sub> = PM<sub>2.5</sub>.
6. Values may be slightly different due to rounding.

## Gas Analysis

The original gas analysis submitted for this application was from December 10, 2019, and had a VOC content of 38.63 weight-percent. A second gas analysis was provided that was taken on June 3, 2021 that had a VOC content of 21.40 weight-percent. MarkWest also presented daily inlet samples for the facility from startup through 2021. From the daily data, MarkWest calculated the highest daily average VOC content of the life of the facility to be 21.67 weight-percent and stated that the December 10, 2019, analysis was an outlier. Ultimately, the June 3, 2021, gas analysis, with a 10% safety factor, was utilized for this application. The Department determines this to be reasonable as this is more conservative than the highest daily average presented by MarkWest.

### **Site-Specific Gas Analysis**

Component	06/03/2021 Analysis	
	Mol. %	Wt. %
Nitrogen	0.44	0.57
Carbon Dioxide	0.12	0.24
Methane	75.08	75.08
Ethane	15.76	21.96
Propane	5.12	10.46
IsoButane	0.53	1.43
n-Butane	1.40	3.77
IsoPentane	0.32	1.07
n-Pentane	0.45	1.50
nhexane	0.43	1.72
Nheptane	0.32	1.48
Benzene	0.04	0.14
Total	100	100
VOC (Total)	8.57	23.62
HAP (Total)	0.47	1.72

1. The estimates assumed a 75.08 weight-percent which is conservative.
2. VOC content includes 10% factor to be conservative.

### **Source/Facility Determination:**

Whether emissions from Harmon Creek and emissions from any other exploration, extraction, production, gathering, processing, or transmission activities should be considered a single source have been examined to determine the applicability of permitting requirements established by the Non-Attainment New Source Review

(NA-NSR), Prevention of Significant Deterioration (PSD), and Title V permitting programs of the Clean Air Act (CAA).

On June 3, 2016, EPA finalized revisions to regulations applicable to permitting of stationary sources of air pollution under NSR and Title V<sup>4</sup>. This final rule clarified the meaning of the term *adjacent* used to determine the scope of a *stationary source* for purposes of NA-NSR and PSD, and the scope of the term *major source* in the title V operating permit program in the onshore oil and natural gas sector. According to the revised meaning of the term *adjacent*, EPA considers equipment/activities adjacent if they are on the same site, or on sites that share equipment and are within a quarter mile (¼-mile) of each other. Sources located beyond ¼-mile are not considered adjacent. Further, equipment/activities located within a ¼-mile that are not sharing equipment are also not considered adjacent.

On June 9, 2018, the Department published a notice in the Pennsylvania Bulletin rescinding its *Guidance for Performing Single Stationary Source Determinations for Oil and Gas Industries* (270-0810-006; October 6, 2012) due to the issuance of the above EPA regulatory revisions. EPA’s revised meaning of the term adjacent is less stringent than the Department’s rescinded guidance which also considered properties located beyond ¼-mile on a case-by-case basis.

Per eMapPA, there are sixteen (16) unconventional wells and two (2) conventional wells permitted under Range Resources Appalachia, LLC. MarkWest marked “No” to “Is there an existing facility within 1/4 mile of your facility”. Because MarkWest indicated that Harmon Creek is not located within ¼ mile of any other facilities, and because of only other wells within ¼ mile are operated by Ranges Resources Appalachia, LLC, the above-referenced facilities do not qualify as adjacent and as such aggregation is not necessary.

**Recommendations and Facility Summary:**

After review, I have determined that MarkWest has demonstrated in this application that the heater increases and continued operation of the constructed equipment meets the requirements of the GP-5 and NSPS and is not expected to cause air pollution as defined in 25 Pa. Code § 121.1. The facility is below the thresholds for Title V, NA-NSR, and PSD, and is not considered a Major Source by these programs. Therefore, I recommend the authorization to operate the following equipment under GP5-63-01011B:

Equipment permitted under GP5-63-01011B:

- One (1) Cryogenic Processing Plant – Increased Capacity from 200 mmscfd to 230 mmscfd
- One (1) De-Ethanization Fractionation Plant
- Cryo Plant 1 Regen Heater (Source ID 031): Increased Capacity from 10.25 MMBtu/hr to 11.84 MMBtu/hr
- Cryo Plant 1 De-Ethanizer HMO Heater (Source ID 033): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Cryo Plant 2 De-Ethanizer HMO Heater (Source ID 034): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Stabilization HMO Heater (Source ID 036): Increased Capacity from 10.37 MMBtu/hr to 11.99 MMBtu/hr

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<sup>4</sup> 81 FR 35622.

- Process Flare (Source ID C601): 8,134 MMBtu/hr; 126.52 MMscf/yr
- Fugitives Emissions (Source ID 701) (Including truck loading and measurement devices)
- Four (4) Pig Launchers controlled by the plant flare (Source ID 801)
- One (1) Pig Receiver controlled by the plant flare (Source ID 801)
- Seven (7) electric driven reciprocating compressors ranging from 75-5,000 hp (rod packing emissions) (Source ID 601)<sup>5</sup>

Plan Approval Exempt Sources:

- Generac SD015 (Source ID 102): 49 bhp
- Generac SD150 (Source ID 102): 279 bhp
- De-Ethanizer Regen Heater (Source ID 035): Modified from 5.79 MMBtu/hr to 6.60 MMBtu/hr
- Amine Unit and Closed Drain Tank (routed to flare)
- Measurement Devices

Other Equipment included within this review:

- Methanol Tanks (Source ID 301) – Existing Source
- 4,200 Amine storage tank (Source ID 301) – Insignificant Existing Source

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<sup>5</sup> One (1) 75 hp compressor, Two (2) 900 hp compressors, Four (4) 5,000 hp compressors