Pennsylvania
Department of
Environmental Protection

MEMO

TO Air Quality Permit File **OP-63-01011**

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DATE March 5, 2026

RE Review Memorandum of Natural Minor State-Only Operating Permit Application
MarkWest Liberty Midstream & Resources, L.L.C.
Harmon Creek Natural Gas Processing Plant
Smith Township
Washington County

APS 1128592 AUTH 1511817 PF 819388

Background:

MarkWest Liberty Midstream & Resources, L.L.C. ("MarkWest") owns and operates the Harmon Creek Natural Gas Processing Plant ("Harmon Creek") located at 123 Point Pleasant Road, Bulger, PA 15019 in Smith Township, Washington County (40.403856, -80.358359). The plant was first authorized for construction, installation, and operation on January 18, 2018, concurrently under GP5-63-01011, GP1-63-01011A, and RFD-63-01011A. The facility is currently permitted under plan approval PA-63-01011, plan approval PA-63-01011B, and general permit GP5-63-01011B.

The permittee conducts non-FERC-regulated midstream natural gas gathering and processing. Activities include constructing and operating non-FERC-regulated, intrastate gathering lines and compression facilities, transporting natural gas from well sites to natural gas processing facilities or interconnections with interstate natural gas transmission pipelines, constructing and operating natural gas processing facilities, transporting natural gas to interconnection points on interstate transmission pipelines, and transporting natural gas liquids to interstate liquid pipelines.

At Harmon Creek specifically, this facility receives and processes dehydrated "wet" natural gas from upstream gathering stations. Gas processing operations at Harmon Creek include extracting natural gas liquids (NGLs) from field gas and partial fractionation of mixed NGLs into natural gas products using stabilization, cryogenic separation, and de-ethanization fractionation to produce residue gas, condensate, NGLs, and purity ethane.

On January 3, 2025, the Department received a state-only operating permit application for this facility that is the subject of this review. The purpose of this review is to consolidate existing permitting requirements

from one of the currently authorized plan approvals and the general operating permit into a state-only operating permit. Specifically, this review will consolidate plan approval PA-63-01011 and general permit GP5-63-01011B into one (1) natural minor state-only operating permit. This state-only operating permit review does not establish best available technology standards nor authorize any new equipment at the facility.

Plan approval PA-63-01011B, issued on May 2, 2025, will be *excluded* from this review, as the facility is still constructing air contamination sources and air cleaning devices authorized under that plan approval. Until such a time as that construction is completed, and compliance with the plan approval is demonstrated, plan approval PA-63-01011B will remain separate from this natural minor state-only operating permit. Upon completion of those activities, the Department may direct MarkWest to submit an administrative amendment application to incorporate the applicable requirements of plan approval PA-63-01011B into the state-only operating permit, if the operating permit subject to this review is authorized by the Department.

The most recent full compliance evaluation (FCE) inspection occurred on July 23, 2024, and covered both plan approval 63-01011 and GP5-63-01011B. No violations were noted during the inspection.

Air contamination sources and air cleaning devices at this facility are shown in Table I below.

Environmental Justice:

The Department adopted an interim final Environmental Justice Policy effective between September 16, 2023, and January 2, 2026. Effective January 3, 2026, the Department adopted an Environmental Justice Policy after consideration of public comments on the interim policy.[1] This application was received on January 3, 2025, and as a pending application currently under review by the Department, it is subject to the Environmental Justice policy of January 3, 2026. According to the Department's publicly accessible online *PennEnviroScreen* Tool, this facility is located in an environmental justice area. In *Appendix C* of the current Environmental Justice Policy, it describes a *trigger project* as either (1) a new major source of hazardous air pollutants or criteria pollutants or (2) a major modification of a major source [subject to Prevention of Significant Deterioration (PSD) or Nonattainment New Source Review (NA-NSR)]. A trigger permit requires enhanced public participation. This facility is classified as a minor source for all criteria pollutants, including VOCs, as well as HAPs. By the definitions of a *major facility* or a *major modification* in 25 Pa. Code §121.1, this facility is neither a new major source of hazardous air pollutants or criteria pollutants nor has triggered a major modification of a major source. Consequently, since this facility does not meet the definition of a *major facility* or a *major modification*, this permitting action is not subject to enhanced public participation procedures.

[1] *Environmental Justice Policy*. Document Number: 015-0501-002. Department of Environmental Protection, Environmental Justice Office. 3 Jan. 2026. < https://greenport.pa.gov/elibrary/GetDocument?docId=10506929&DocName=01%20ENVIRONMENTAL%20JUSTICE%20POLICY.PDF%20%20%3Cspan%20style%3D%22color%3Agreen%3B%22%3E%3C%2Fspan%3E%20%3Cspan%20style%3D%22color%3Ablue%3B%22%3E(NEW)%3C%2Fspan%3E>.

Table I:
Air Contamination Sources and Air Cleaning Devices

Source ID	Description		Capacity/Rating		Make & Model	Control	Authorized Under	Date First Authorized	SCC	Stack
031	11.84 MMBtu/hr Cryo Plant 1 Regen Heater (H-1711)		11.84 MMBtu/hr (previously 10.25 MMBtu/hr)		Tulsa Heaters (S/N: MJ17-257)	---	GP1-63-01011A Increased Capacity under GP5-63-01011B	01/17/2018	10200602	426ºF, 11% moisture, 5,702 acfm
033	48.15 MMBtu/hr De-Ethanizer HMO Heater 1 (H-1767)		48.15 MMBtu/hr (previously 41.22 MMBtu/hr)		Scelerin HP17-843.B (S/N: 647-005A)	---	GP1-63-01011A Increased Capacity under GP5-63-01011B	01/17/2018	10200602	511ºF, 11% moisture, 20,819 acfm
034	48.15 MMBtu/hr De-Ethanizer HMO Heater 2 (H-1768)		48.15 MMBtu/hr (previously 41.22 MMBtu/hr)		Scelerin HP17-843.B (S/N: 647-005B)	---	GP1-63-01011A Increased Capacity under GP5-63-01011B	01/17/2018	10200602	511ºF, 11% moisture, 20,819 acfm
035	6.60 MMBtu/hr De-Ethanizer Regen Heater (H-1775)		6.60 MMBtu/hr (previously 5.79 MMBtu/hr)		Tulsa Heaters P17-0422 (S/N: MJ17-255)	---	RFD-63-01011A Increased Capacity under GP5-63-01011B	01/17/2018	10200602	437ºF, 11% moisture, 3,259 acfm
036	11.99 MMBtu/hr Stabilization HMO Heater (H-1769)		11.99 MMBtu/hr (previously 10.37 MMBtu/hr)		Tulsa Heaters P17-0423 (S/N: MJ17-256)	---	GP1-63-01011A Increased Capacity under GP5-63-01011B	01/17/2018	10200602	373ºF, 11% moisture, 5,433 acfm
037	17.84 MMBtu/hr Cryo Plant 2 Regen Heater (H-2711)		17.84 MMBtu/hr		Tulsa Heaters (S/N: MJ17-300)	FGR	PA-63-01011	04/12/2023	10200602	461ºF, 11% moisture, 15,796 acfm
101	Seven (7) Electric Driven Reciprocating Compressors Rod Packing (Harmon Creek 1)		Seven (7) 5,000-HP Compressors		---	---	GP5-63-01011A	01/17/2018	31000299	Varies
102	Emergency Diesel-Fired Generators	Admin Room	2.7 gal/hr	15-kW Genset w/ 49-HP Diesel Engine (Tier 4)	Generac SD015 Genset/ Generac A2400T-Gen 1 Engine	---	RFD-63-01011B	03/07/2019	20200102	---
		Control Room	13.5 gal/hr	150-kW Genset w/ 279-HP Diesel Engine (Tier 3)	Generac SD150 Genset/ Generac 4BT3.3-G5 Engine	---	RFD-63-01011B	03/07/2019	20200102	---
103	Three (3) Electric Driven Reciprocating Compressors Rod Packing (Harmon Creek 2)	Stabilization Compressors (2)	Three (3) 5,000-HP Compressors		---	---	PA-63-01011	04/12/2023	31000299	Varies
		CO_2 Compressor (1)								
104	Centrifugal Dry Seal Vents	Residue Centrifugal Compressors (2)	600 scfh		---	---	GP5-63-01011A	01/17/2018	31000299	Varies
		Regen Centrifugal Compressors (2)	600 scfh; 1.339 lbs/hr (98% DE)		---	(Partial) C601: 126.52 MMscf/yr Plant Flare				
202	Amine Unit		---		---	---	GP5-63-01011A	01/17/2018	31000201	---
301	Tanks/Vessels	Closed Drain Tank	4,200-gallons		---	C601: 126.52 MMscf/yr Plant Flare	RFD-63-01011C	01/17/2018	31000214	---
		Amine Tank	1,430-gallons				RFD-63-01011C			
302	Two (2) 500-Gallon Methanol Tanks		500-gallons each; 100 gal/yr total usage		---	---	GP5-63-01011A	2018/2023	31000214	Ambient
601	Venting/Blowdowns		---		---	C601: 126.52 MMscf/yr Plant Flare	GP5-63-01011A	01/17/2018	31000299	Ambient
701	Fugitives		---		---	Leak Detection & Repair (LDAR)	GP5-63-01011A & PA-63-01011	04/12/2023	31000220	Ambient
702	Truck Loadout		220,000 gal/yr		---	C601: 126.52 MMscf/yr Plant Flare	GP5-63-01011B	2018/2022	31000299	Ambient
703	Measurement Devices		2.15 scfh		---	---	GP5-63-01011B	2018/2023	31000299	Ambient, 2.15 scfh
801	Pigging		---		---	C601: 126.52 MMscf/yr Plant Flare	GP5-63-01011A	01/17/2018	31000299	Ambient
C037	Cryo Plant 2 Regen Heater FGR		---		---	---	PA-63-01011	04/12/2023	31000205	---
C601	Plant Flare		8,134 MMBtu/hr; 126.52 MMscf/yr		John Zink EEF Series Open Flare	---	GP5-63-01011A	01/17/2018	31000205	---
Misc.	Air-Actuated Pneumatic Devices (previously 501)		---		---	---	GP5-63-01011A	01/17/2018	31000299	---
FML 01	Natural Gas		---		---	---	---	---	n/a	---

- Source 032 was authorized under GP1-63-01011A as the same make, model, and capacity as Source 031; however, Source 032 was never constructed.
- HMO Heater means hot medium oil heater.
- HHV of the natural gas used in the heaters is 1,153 Btu/scf.
- Source 703, Measurement Devices, were first authorized under GP5-63-01011B under Source 701, Fugitives, and later speciated as Source 703 under PA-63-01011. Includes O_2 analyzers and GC streams.
- Source 702, Truck Loadout, was previously included under Source 601 for GP5-63-01011A before being speciated as a separate source under 702.
- Plant Flare capable of handling up to 126.52 MMscf/yr (100 MMscf/yr from combustion and 26.52 MMBtu/hr from the pilot and purge gas). 98% destruction efficiency of hydrocarbons based on manufacturer's guarantee.
- All previous natural gas-fired pneumatic devices have been converted to compressed air-driven.

Authorizations:

Table II shows a summary of the authorization history at this facility.

Table II:

Auth ID	Permit No.	Disposition	Permit Type	App Code	Received	Disposed	Expires
n/a	GP5-63-01011A	ISSU	General Permit	NEW	06/12/2017	01/17/2018	01/17/2023
1187582	GP1-63-01011A	ISSU	General Permit	NEW	06/12/2017	01/17/2018	01/17/2023
n/a	RFD-63-01011A	n/a	Request for Determination	NEW	06/12/2017	01/17/2018	n/a
n/a	RFD-63-01011B	n/a	Request for Determination	NEW	02/19/2019	03/07/2019	n/a
1337535	GP5-63-01011B	ISSU	General Permit	NEW	12/10/2020	06/29/2022	06/29/2027
n/a	RFD-63-01011C	n/a	Request for Determination	NEW	12/10/2020	06/29/2022	n/a
1402339	PA-63-01011	ISSU	Plan Approval	NEW	06/29/2022	04/12/2023	09/28/2023
1454502	PA-63-01011	ISSU	Plan Approval	EXT	09/12/2023	09/19/2023	03/28/2024
1474496	PA-63-01011	ISSU	Plan Approval	EXT	02/16/2024	03/11/2024	09/28/2024
1472565	PA-63-01011	ISSU	Plan Approval	MOD	02/01/2024	03/11/2024	03/28/2024
1497062	PA-63-01011	ISSU	Plan Approval	EXT	08/26/2024	09/12/2024	03/28/2025
1517705	PA-63-01011	ISSU	Plan Approval	EXT	02/25/2025	03/20/2025	09/28/2025
1514603	PA-63-01011B	ISSU	Plan Approval	NEW	01/17/2025	05/02/2025	11/02/2026
1542733	PA-63-01011	ISSU	Plan Approval	EXT	09/12/2025	09/23/2025	03/28/2026
1511817	OP-63-01011	PEND	NM Operating Permit	NEW	01/03/2025	Pending	Pending

GP5-63-01011A, GP1-63-01011A, and RFD-63-01011A:

On June 12, 2017, the Department received applications for a GP-5, GP-1, and a Request for Determination (RFD) application from MarkWest for the construction and operation of a new natural gas processing plant known as the Harmon Creek Gas Plant. Under the GP-5 application, MarkWest proposed to construct, install, and operate the following natural gas processing plant air contamination sources and air cleaning devices under GP5-63-01011A:

- Two (2) 200 MMscfd 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

No natural gas-fired engines were proposed at this facility, as power was and is available for electric drive compressor engines. Furthermore, no natural gas-fired turbines, dehydrators, condensate storage tanks, or product storage tanks were proposed.

MarkWest concurrently proposed to install and operate the following heaters associated with the processing plant under GP1-63-01011A:

- 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-ethanization HMO heaters
- One (1) 10.37 MMBtu/hr natural gas-fired Tulsa Heaters stabilization HMO heater

MarkWest also proposed to install the following equipment under RFD-63-01011A:

- One (1) 27-HP Cummins C15 diesel-fired admin room emergency generator engine
- Two (2) 69-HP Cummins C35 diesel-fired electric room emergency generator engines

- One (1) 5.79 MMBtu/hr natural gas-fired DeEthanization regeneration heater
- Two (2) high-pressure pig launchers controlled by the plant flare
- Three (3) high-pressure pig receivers controlled by the plant flare

The equipment proposed under the two (2) general permits were evaluated and met all general permit requirements, and it was determined that the facility was eligible to use the general permits.

On January 17, 2018, the Department granted authorization for the use of the GP-5 and the GP-1, as well as determined that the sources listed in the RFD were exempt from plan approval requirements. Regarding the RFD, per the review memorandum associated with this action dated January 12, 2018, in relevant part:

> …the Department has determined that the two (2) proposed 27 bhp diesel-fired engines and one (1) 69 bhp diesel-fired engine are exempt from plan approval and operating permit under 25 Pa. Code §127.14(d) listed as No. 4 (engines less than 100 bhp) in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8).
>
> The Department has determined that the proposed 5.79 MMBtu/hr heater is exempt from plan approval and operating permit under 25 Pa. Code §127.14(d) listed as No. 39 (natural gas-fired combustion units less than 10 MMBtu/hr) in the Department's Plan Approval and Operating Permit Exemptions list under 25 Pa. Code §127.14(a)(8).
>
> The Department has determined proposed pig launchers/receivers controlled by the plant flare at Harmon Creek are exempt from Plan Approval and Operating Permit requirements as determined through a Request for Determination (RFD) under 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). It is the Department's understanding that pigging activities will consist of the following equipment:
>
> - One (1) 20" high pressure fuel residue pig launcher controlled by the plant flare
> - One (1) 20" high pressure Rover residue line pig launcher controlled by the plant flare
> - One (1) 20" high pressure Smith CS to Harmon Creek pig receiver controlled by the plant flare
> - Two (2) potential future 20" high pressure pig receivers controlled by the plant flare
>
> It is also the Department's understanding that the plant flare will be operated and maintained in accordance with manufacturer's specifications, good engineering practice, and 40 CFR 60.18 to achieve a minimum 98% destruction efficiency. Pigging emissions shall be recorded and reported along with all other facility emissions in accordance with GP-5 Section A. Condition 15. Potential emissions from pigging activities are shown in Table 6 of this review memo. Actual emissions from all pigging activities combined may not exceed 2.7 tons of VOC, 0.5 tons of any single HAP, or 1.0 ton of total HAP in any consecutive 12-month period…

RFD-63-01011B:

On February 19, 2019, the Department received a RFD application from MarkWest. In the request, MarkWest noted that on January 18, 2018, the Department authorized the use of a GP-1 and a GP-5 and approved an RFD for the initial construction and operation of the Harmon Creek Gas Plant. As a part of the RFD evaluated at that time, the Department determined that the use of three (3) emergency generator engines was exempt from plan approval requirements. Between that approval and the RFD application dated February 19, 2019, the generators had not been installed, and an engineering evaluation at MarkWest determined that the facility only needed two (2) emergency generator engines of a different make and model.

On March 7, 2019, the Department determined that one (1) Generac SD015 15-kW emergency genset powered by a Tier 4 (interim) certified 49-HP diesel engine and one (1) Generac SD150 150-kW emergency genset powered by a Tier 3 certified 279-HP diesel engine are sources of minor significance and were exempt from plan approval and operating permit requirements based on the Department's Published Notice of Plan Approval and Operating Permit Exemptions (275-2101-003; August 8, 2018) under 25 Pa. Code §127.14(a)(8) as established in accordance with §127.14(d). Specifically, the gensets qualified for exemption under item No. 6 – "Internal combustion engines, regardless of size, with combined NOx emissions less than 100 lbs/hr, 1000 lbs/day, 2.75 tons per ozone season and 6.6 TPY on a 12-month rolling basis for all exempt engines at the site." It was the Department's understanding that each engine would be operated during emergencies only for up to

500 hours per year, resulting in combined NOx emissions not to exceed 0.52 tons per year. This change was anticipated to reduce potential emissions at the facility by 2.02 TPY NOx, and a slight increase of 0.11 TPY CO and 0.11 TPY VOC, respectively.

GP5-63-01011B (AG5-63-00011A) and RFD-63-01011C:

On December 10, 2020, the Department received an application to reauthorize the general permit with select modifications. At the time, the facility was operating under both a GP-5 and a GP-1, specifically GP5-63-01011A and GP1-63-01011A, both of which were authorized on January 17, 2018. The 2018 version of the GP-5 was amended to include combustion units, thereby making the continued use of the GP-1 unnecessary. This application proposed to incorporate the five (5) heaters operating with authorization under GP1-63-01011A into a reauthorization of a GP-5 permit, incorporate the sixth heater authorized under RFD-63-01011 into a reauthorization of a GP-5 permit, and modify the maximum heat input ratings for those six (6) heaters.

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 authorized under GP5-63-01011A was never installed at this facility, and a lapse in construction exceeding eighteen (18) months occurred:

- Harmon Creek 2 – a 200 MMscfd cryogenic processing plant
  [i.e. Only one (1) of two 200 MMscfd cryogenic processing plant was constructed]

- One (1) Cryo Mol Sieve Regen Heater (H-2711) covered under the GP-1
  [i.e. Only one (1) of two 10.25 MMBtu/hr natural gas-fired Tulsa Heater cryo mol sieve regen heaters was constructed]

- Three (3) 5,000-HP electric driven reciprocating compressors
  [i.e. Only seven (7) of ten 5,000-HP electric driven reciprocating compressors were constructed]

Due to the lack of construction commencing within eighteen (18) months and due to a revision to the most recent version of the GP-5 issued by the Department in June 2018, a plan approval was required to authorize those sources.

The review of GP5-63-01011B only considered one of the operating cryogenic processing plants, because the second cryogenic processing plant authorized under GP5-63-01011A had not yet been constructed at the time of that review.[2] For the December 10, 2020, application under GP5-63-01011B, the following air contamination sources and air cleaning devices were permitted for continued operation under GP5-63-01011B:

- One (1) Cryogenic Processing Plant with an increased capacity from 200 MMscfd to 230 MMscfd
- One (1) De-Ethanization Fractionation Plant
- Cryo Plant 1 Regen Heater (Source 031): Increased Capacity from 10.25 MMBtu/hr to 11.84 MMBtu/hr
- Cryo Plant 1 De-Ethanizer HMO Heater (Source 033): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Cryo Plant 2 De-Ethanizer HMO Heater (Source 034): Increased Capacity from 41.22 MMBtu/hr to 48.15 MMBtu/hr
- Stabilization HMO Heater (Source 036): Increased Capacity from 10.37 MMBtu/hr to 11.99 MMBtu/hr
- Process Flare (Source C601): 8,134 MMBtu/hr; 126.52 MMscf/yr
- Fugitives Emissions (Source 701) (Including truck loadout and measurement devices)
- Four (4) Pig Launchers controlled by the plant flare (Source 801)
- One (1) Pig Receiver controlled by the plant flare (Source 801)

[2] Both the first and second cryogenic processing lines at Harmon Creek were first authorized under GP5-63-01011A, but since construction had lapsed for the second line (Harmon Creek II), it was not authorized for construction until PA-63-01011.

- Seven (7) electric driven reciprocating compressors ranging from 75-HP - 5,000-HP (rod packing emissions) (Source 601)[3]

Sources that were exempt from plan approval were as follows:

- Generac SD015 (Source 102): 49-HP
- Generac SD150 (Source 102): 279-HP
- De-Ethanizer Regen Heater (Source 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 the review of GP5-63-01011B:

- Two (2) 500-gallon methanol tanks (Source 301)
- One (1) 4,200-gallon amine storage tank (Source 301)

In addition to the application to reauthorize a GP-5, on January 6, 2020, the Department received an RFD application that was incorporated into the review of GP5-63-01011B. The RFD requested two items for review: (1) that an existing amine unit and drain tank be exempted from plan approval requirements as well as (2) exempt from plan approval an increase in the capacity of the cryogenic processing plants.

Typically, an amine unit serves to sweeten sour gas, which is a process that removes impurities such as hydrogen sulfide and carbon dioxide to make it more suitable for transportation and sale. The amine unit at Harmon Creek was not designed to sweeten gas. The purpose of the amine unit is to remove CO_2 from the ethane stream (rather than a natural gas stream) and reinject it into the residue gas pipeline. Since the CO_2 is reinjected into the pipeline and there are no VOCs present, there are no emissions associated with the amine unit. The amine tank has a capacity of 1,430-gallons.

The closed drain tank receives water produced from pigging operations of inlet pipelines. Liquids, primarily NGL and water, collect in the pipeline and must be periodically pigged into the Harmon Creek facility. The liquids are collected in a series of slug catchers where the water and NGL are separated. The water is sent to the closed drain tank while the NGL continues to the stabilizer. The closed drain tank does not have a vent to the atmosphere. The closed drain tank is equipped with a pressure relief valve (PRV) in the event that hydrocarbons would be introduced to the tank and could begin to pressurize the vessel, and the PRV is routed into a collection line to the flare for destruction. In the event that the flare is down, the gas stream stays within the tanks. The closed drain tank has a capacity of 4,200-gallons.

During the review of GP5-63-01011B, the Department determined that the amine unit, including the associated two (2) tanks, were 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).

According to the review of GP5-63-01011B, the existing cryogenic processing plant at the facility was permitted with a nominal capacity of 200 MMscf/day. The RFD application noted that under certain conditions, the plant could potentially process up to 230 MMscf/day. This difference was evaluated as follows: The air contamination sources for the cryogenic processing units comprise of fugitive emission components and heaters. The heaters were and are permitted at capacities that represent the maximum heat throughput for each unit. The review memorandum noted that although *actual* emissions may increase by up to 10% from additional usage of the heaters, the *potential-to-emit* would not increase from the capacity increase since the heaters were permitted at maximum capacity and since leak detection and repair (LDAR) monitoring would continue to

[3] One (1) 75-HP compressor, two (2) 900-HP compressors, four (4) 5,000-HP compressors.

occur to identify and repair any potential leaks in accordance with the requirements of the GP-5; consequently, fugitive emissions would not have been expected to increase as a result of the increase in processing capacity from 200 MMscfd to 230 MMscfd. Under this review, the Department determined that the capacity increase did not trigger any new requirements under the GP-5.

Lastly, as a part of that RFD application that was incorporated into the review of GP5-63-01011B, it was noted that measurement devices at the facility have a potential-to-emit 0.78 TPY VOC and 0.06 TPY total HAPs. The Department determined that the measurement devices were exempt from plan approval requirements under 25 Pa. Code §127.14(a)(7) in the Department's Plan Approval and Operating Permit Exemptions and noted that potential emissions from those measurement devices were still accounted for in the review of GP5-63-01011B. This source is listed as Source 703 in the proposed operating permit.

In summary, the review of GP5-63-01011B and a concurrent RFD application authorized the continued operation, construction, installation, and operation of existing air contamination sources and air cleaning devices on June 29, 2022. In addition, this authorization allowed for an increase in capacity of the heaters and processing capabilities of the plant as proposed in the application. This authorization superseded the prior authorizations of GP5-63-01011A and GP1-63-01011A.

PA-63-01011:

On June 29, 2022, the same date that GP5-63-01011B was authorized, the Department received a plan approval application from MarkWest to construct, install, modify, and operate the following new air contamination sources:

- One (1) new 260 MMscfd natural gas processing plant (Source 404, "Harmon Creek 2");
- A 17.84 MMBtu/hr Cryo Plant 2 regenerative heater[4] (Source 037) equipped with flue gas recirculation (Source C037);
- One (1) additional 500-gallon methanol storage tank (Source 302);
- Three (3) 5,000-HP electric-driven compressors (rod-packing venting) (Source 103);
- Proposed modifications to Fugitive Emission Sources (Source 701);
- Speciated Truck Loadout as a separate source (Source 702) rather than being categorized under Source 701, Fugitives, as was the case under GP5-63-01011B;
- Speciating four (4) Measurement Devices as a separate source under Source 703, which were previously included under Fugitives emission sources under GP5-63-01011B;
- Emergency/Uncontrolled Venting/Blowdowns (Source 602) – This source was not a proposed source within the application; however, it was evaluated under this plan approval. Any planned shutdowns are vented to the existing flare.
- The existing flare controls fugitive emissions emitted from the proposed pressure relief devices where technically feasible in this plan approval application. The flare also controls maintenance blowdowns and pressure safety valves from the Harmon Creek Cryo II processing line. Because of this, although it was an existing control device, the flare was included in the review of plan approval PA-63-01011.

On April 12, 2023, plan approval PA-63-01011 was authorized. This authorization included equipment that was previously authorized under GP5-63-01011A as well as the other changes reflected in the list above.

[4] The regenerative heater is direct-fired, however, it produces indirect heat during the process, as it is contains a shell and tube system and meets the 25 Pa. Code §121.1 definition of a combustion unit. Residue pipeline quality gas is routed through the shell and tube system to be heated. Gas is then transferred to molecular sieve units where heated gas is in direct contact with packing media.

On April 17, 2023, the Department was notified of commencement of construction for the air contamination sources authorized under PA-63-01011, which included Harmon Creek 2 – a 260 MMscfd cryogenic processing plant, one (1) cryo mol sieve regen heater (H-2711), and three (3) electric driven compressors with rod packing. According to that notification, construction activities were anticipated to be completed by December 13, 2023. Startup of the Harmon Creek II plant commenced on February 14, 2024.

PA-63-01011B:

On January 19, 2024, the Department received an application for Plan Approval to construct and operate the following air contamination sources and air cleaning devices which comprise the proposed DeEthanizer II and 330 MMscfd Harmon Creek Cryo 3 projects:

- One (1) Cryo Plant 3 regenerative heater rated at a maximum heat input of 21.75 MMBtu/hr equipped with flue gas recirculation (FGR).
- Two (2) DeEthanizer II hot medium oil (HMO) heaters rated at a maximum heat input of 73.85 MMBtu/hr and equipped with FGR.
- One (1) 500-gallon methanol storage tank.
- One (1) high-pressure pig receiver controlled by the process flare.
- Three (3) electric-driven centrifugal compressors and associated dry seal gas venting.
- One (1) electric-driven reciprocating compressor.
- Associated fugitive emissions components.

Additionally, emission increases associated with truck loadout operations, emissions from maintenance blowdowns and some pressure relief devices, where feasible, were initially proposed to be controlled by the existing plant flare. The project increased gas processing capacity at Harmon Creek to accommodate additional production from gas suppliers and was initially proposed to result in potential emissions that would exceed the major source threshold for volatile organic compounds (VOCs). However, after additional review and discussions with the permittee, MarkWest committed to constructing a vapor recover unit (VRU) system to capture 100% of emissions that were initially proposed to be controlled by the existing plant flare (including those from maintenance blowdowns, closed drain tank loadout operations, dry seal vents associated with the proposed centrifugal compressors, and the proposed pig receiver), with emissions due to VRU maintenance downtime (estimated at approximately 5% of the year or 438 hours) being sent to the existing plant flare. MarkWest also further refined (reduced) estimates for fugitive emissions using historic leak detection and repair (LDAR) emissions reduction data and enhancing its LDAR program to include semi-annual Method 21 leak detection. The Department also required semi-annual LDAR using optical gas imaging (OGI). The resulting VOC emissions reductions lowered the project potential-to-emit to less than the major source thresholds which were practicably enforceable by the imposition of synthetic minor Plan Approval restrictions. Certain other equipment design standards, like low-emitting valves, were also included in the project. This plan approval also established a 9 ppm NOx emission limitation for the heaters authorized under this plan approval.

On May 2, 2025, the Department authorized plan approval PA-63-01011B to this facility. Notification of commencement of construction occurred on May 5, 2025, for the following air contamination sources and air cleaning devices:

- Harmon Creek 3 – one (1) 330 MMscfd Cryogenic Processing Plant
- De-Ethanizer 2
- One (1) Cryo Regen Heater w/ FGR
- Two (2) De-Ethanizer HMO heaters w/ FGR
- One (1) Electric Driven Compressor with Rod Packing
- Three (3) Electric Driven Centrifugal Compressors

- One (1) Vapor Recovery Unit
- One (1) 500-gallon Methanol Tank
- One (1) High-Pressure Pig Receiver

Construction activities are expected to be completed in May 2026. On May 21, 2025, the Department was in receipt of the initial notification requirement under the New Source Performance Standards (NSPS) §60.48c(a) of Subpart Dc for one (1) heater, Source 037, a Tulsa Heaters Midstream SHO Heater (MJ17-300), identified by the permittee as H-2711. Startup of the heater was noted to have commenced on February 14, 2024.

As mentioned earlier in this document, although the scope of plan approval PA-63-01011B is described in the above paragraphs, because the air contamination sources and air cleaning devices authorized under that plan approval are still undergoing construction, and until such a time that construction activities are completed, an initial operating permit inspection is conducted, and compliance with the terms and conditions of the plan approval are demonstrated, this plan approval will be *excluded* from this review and will not be incorporated into this proposed state-only operating permit at this time.

Compliance History:

On April 24, 2018, the Commonwealth of Pennsylvania and the United States Environmental Protection Agency entered into a Consent Decree with MarkWest Liberty Midstream & Resources, LLC and Ohio Gathering Company, LLC that required MarkWest to obtain state-only operating permits for a number of compressor stations and pigging operations across the southwest region of the Commonwealth and portions of Ohio (*see* civil action 2:18-cv-00520-LPL) as well as implement a fence line monitoring program at Harmon Creek. The consent decree also required that MarkWest install enclosed flares at select compressor stations and implement certain best management practices when conducting pigging operations. On July 9, 2018, an order granting motion to approve the consent decree was granted. This facility was subject to the applicable fence line monitoring requirements of the consent decree.

At Harmon Creek specifically, in accordance with Appendix 8 of the Consent Decree, MarkWest was required to install and operate, for a period of at least seven hundred twenty (720) days, one (1) meteorological station and three (3) VOC air sampling stations located around (at that time) the proposed Harmon Creek Gas Processing Plant. Within one hundred twenty (120) days of the Effective Date, MarkWest was to submit a plan to the EPA and to the Department to conduct ambient air monitoring near the facility. MarkWest was also required to submit quarterly information reports and annual reports. Data was generated from three monitoring locations from November 29, 2019, to July 12, 2022. According to the final report, the annual average for total hydrocarbons was 17.99 ppb for the upwind monitoring site location, 25.80 for the first downwind site, and 17.35 ppb for the second downwind site. After completion of the monitoring project, the equipment was removed. On May 19, 2025, the Consent Decree was formally terminated, as MarkWest had demonstrated compliance with all requirements to the satisfaction of both the EPA and the Department.

On January 25, March 8, April 23, and April 29, 2021, visible emissions were observed from the facility that resulted in a notice of violation (NOV) on or around April 23, 2021. On October 5, 2022, MarkWest and the Department entered into a Consent Assessment of Civil Penalty (CACP) for these violations.

On July 9, 2024, an NOV was sent to MarkWest for failing to send a complete annual compliance certification report. On July 15, 2024, MarkWest provided the updated annual compliance certification form which included information requested by the Department such as LDAR monitoring records and 12-month rolling totals of actual emissions.

Testing:

On April 4, 2019, the Department received a testing protocol to test for NOx, CO, and NMEHC for Sources 031, 033, 034, 035, and 036. Testing of these sources occurred on April 23-24, and on May 24, 2019. On July 9, 2019, the testing protocol was conditionally approved (post testing date). The test results appeared to indicate compliance with all permitted emission limitations. A revised testing report was later submitted to fix incorrect source descriptions of Source 035 and 036 in the original report.

On October 23, 2020, Sources 033 and 034, the two (2) deEthanizer heaters (rated at 41.22 MMBtu/hr at that time), underwent performance testing. The results appear to indicate compliance with permitted emission limitations.

On November 30, 2022, the Department received notification for proposed testing to occur on December 12, 2022, using a previously approved testing protocol dated April 4, 2019. The proposed testing was for Sources 031, 033, 034, and 036. The Department sent correspondence conditionally approving the protocol on January 3, 2023 (post testing date). In a telephone call on February 20, 2026, MarkWest confirmed that Sources 033 (H-1767) and 034 (H-1768) were tested in 2022 and that Sources 031 (H-1711) and 036 (H-1769) were tested in 2023. At the time of writing, these reports are not currently listed in the Department's PSIMS system.

On January 11, 2024, MarkWest submitted a protocol for performance testing of Source 037, the Cryo Plant 2 17.84 MMBtu/hr regen heater. Testing was anticipated to occur on April 18, 2024. On February 15, 2025, the Department conditionally approved the protocol (post testing date).

On July 17, 2024, MarkWest conducted stack testing on Source 037, the Cryo Plant 2 17.84 MMBtu/hr regen heater. Per the test report dated and received by the Department on August 15, 2024, the measured emissions rates for NOx and CO appear to be compliant with the applicable plan approval limitations.

On December 17, 2025, the Department received a pre-test protocol for Source 037, the 17.84 MMBtu/hr Cryo Plant 2 regen heater to test for NOx, CO, and NMEHC. Testing of this source is anticipated to occur on March 20, 2026. The protocol was conditionally approved on January 14, 2026. Additional protocols may no longer be required provided that testing methodologies and performance testing companies do not change.

Single Source Determination:

Stationary sources should be evaluated for aggregation to determine major source status with respect to New Source Review (NSR) and Title V (major source) permitting. Aggregation based on the EPA's definition of "stationary source" and "building, structure, facility, or installation," as defined in 40 CFR §52.21(b)(5) and (6) [81 FR 35622, dated June 3, 2016] which stated to be considered a single source, the following three criteria must be met:

- Criterion 1: The pollutant-emitting activities must belong to the same industrial grouping, meaning that they have the same first two digits of the Standard Industrial Classification (SIC). For onshore activities, the SIC Major Group is 13 – *Oil and Gas Extraction*.
- Criterion 2: The pollutant-emitting activities must be under common control.
- Criterion 3: The pollutant-emitting activities must be located on one or more contiguous or adjacent properties. The EPA considers pollutant-emitting activities for onshore activities, under SIC Major Group 13, as adjacent if they are located on the same surface site or located on one or more surface sites that are located within one quarter (¼) of a mile of one another, as measured from the center of the equipment on the surface site, and share equipment. "Surface site," as defined in 40 CFR §63.761, means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

However, per the 25 Pa. Code §121.1 definition of a *facility*, which the Air Quality Program follows, only two (2) criteria must be met for a source that is not subject to Prevention of Significant Deterioration requirements:

- Criterion 1: The pollutant-emitting activities must be under common control.
- Criterion 2: The pollutant-emitting activities must be located on one or more contiguous or adjacent properties. The EPA considers pollutant-emitting activities for onshore activities, under SIC Major Group 13, as adjacent if they are located on the same surface site or located on one or more surface sites that are located within one quarter (¼) of a mile of one another, as measured from the center of the equipment on the surface site, and share equipment.

The air contamination sources at Harmon Creek are owned and operated by MarkWest Liberty Midstream & Resources, L.L.C., thereby satisfying Criteria 1 above. For Criterion 2, there are no MarkWest-owned or operated emissions sources within one quarter (¼) of a mile of the site, satisfying Criterion 2. Consequently, there are no other stationary air contamination sources to be aggregated with this facility.

Best Available Technology (BAT):

All new sources are required to meet best available technology (BAT) standards in accordance with 25 Pa. Code §127.1. Per the definition under 25 Pa. Code §121.1, *best available technology* is defined as "Equipment, devices, methods, or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be made available." 25 Pa. Code §127.1 states, "New sources shall control the emission of air pollutants to the maximum extent, consistent with the best available technology as determined by the Department as of the date of issuance of the plan approval for the new source."

Best available technology applies at the time of authorization to construct, install, and temporarily operate air contamination sources via a plan approval or a general operating permit and can include various control technologies such as implementation of oxidation catalysts, control by an enclosed flare, emission limitations, or work practice standards, among others.

Since this review is to consolidate existing permitting requirements under GP5-63-01011B, plan approval PA-63-01011, and sources approved via request for determinations, and is not authorizing any new air contamination sources, this review cannot *establish* BAT. In other words, a best available technology evaluation is outside the scope of this review because no new sources or modifications are being proposed in this application, and such a change may require a plan approval application to authorize the construction, installation, and temporary operation of such sources. However, previously established BAT requirements for any given air contamination sources under those authorizations will be reflected in the proposed natural minor state-only operating permit.

Regulatory Analysis:

Any facility authorized to operate under a general permit, plan approval, or operating permit must be operated in such a manner as to not cause air pollution as defined in 25 Pa. Code §121.1, operated and maintained in a manner consistent with good operating and maintenance practices, operated and maintained in accordance with the manufacturer's specifications, and the specifications and applicable terms and conditions of the general permit, plan approval, or state-only operating permit. Furthermore, nothing in the proposed state-only operating permit or currently authorized general permit and plan approval relieves the owner or operator from the obligation to comply with all applicable Federal, State, and local laws and regulations, which may include New Source Performance Standards (NSPS) in 40 CFR Part 60 (incorporated by reference in 25 Pa. Code §122.3) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) codified under 40 CFR Parts 61 and 63 (incorporated by reference in 25 Pa. Code §124.3 and §127.35, respectively).

25 Pa. Code Chapters 121-145:

Per **25 Pa. Code §127.402(a) (*General Provisions*)**, a permit is required to operate a stationary air contamination source. An air contamination source is defined in 25 Pa. Code §121.1 as "any place, facility or equipment, stationary or mobile, at, from or by reason of which there is emitted into the outdoor atmosphere any air contaminant." This facility meets the above definition of an air contamination source. Therefore, an operating permit is required.

25 Pa. Code §121.7 (*Prohibition of air pollution*) is applicable and requires that no person may permit air pollution as that term is defined in the act.

Per **25 Pa. Code §123.1 (*Prohibition of certain fugitive emissions*)**, "No person may permit the emission into the outdoor atmosphere of a fugitive air contaminant from a source…" outside of certain limited activities described in the regulation such as clearing land or stockpiling materials, among others, provided that reasonable action is taken to prevent particulate matter from becoming airborne. A permittee subject to this regulation may be permitted to emit a fugitive air contaminant from a source in accordance with paragraph (9) of this regulation whereby the Department has determined that the emissions are of minor significance with respect to causing air pollution or are not preventing or interfering with the attainment status of an ambient air quality standard. A fugitive air contaminant is defined in 25 Pa. Code §121.1 as "an air contaminant of the outdoor atmosphere not emitted through a flue, including, but not limited to, industrial process losses, stockpile losses, reentrained dust and construction/demolition activities." MarkWest is prohibited from emitting such fugitive emissions from any process except as allowable under this regulation.

Per **25 Pa. Code §123.2 (*Fugitive particulate matter*),** "A person may not permit fugitive particulate matter to be emitted into the outdoor atmosphere from a source specified in §123.1(a)(1) - (9) (relating to prohibition of certain fugitive emissions) if the emissions are visible at the point the emissions pass outside the person's property." MarkWest is prohibited from emitting fugitive particulate matter emissions as specified in §123.1(a)(1) - (9) if they are visible beyond their property line.

According to 25 Pa. Code §121.1, a *combustion unit* is defined as "stationary equipment used to burn fuel primarily for the purpose of producing power or heat by indirect heat transfer". The following air contamination sources meet the definition of a combustion unit since each unit produces heat by means of indirect heat transfer:

- Source 031, the 11.84 MMBtu/hr Cryo Plant 1 Regen Heater (H-1711)
- Source 033, the 48.15 MMBtu/hr De-Ethanizer HMO Heater 1 (H-1767)
- Source 034, the 48.15 MMBtu/hr De-Ethanizer HMO Heater 2 (H-1768)
- Source 035, the 6.60 MMBtu/hr De-Ethanizer Regen Heater 2 (H-1775)
- Source 036, an 11.99 MMBtu/hr Stabilization HMO Heater (H-1769)
- Source 037, a 17.84 MMBtu/hr Cryo Plant 2 Regen Heater (H-2711)

These units are subject to the requirements of **25 Pa. Code §123.11** (***Combustion Units***), which specifies that a person may not permit the emission of particulate matter from a combustion unit in excess of the 0.4 lbs PM/MMBtu for units with heat input greater than 2.5 MMBtu/hr and less than 50.0 MMBtu/hr as specified in §123.11(a)(1). Since the heaters have heat input ratings between 6.60 MMBtu/hr and 48.15 MMBtu/hr, this regulation does apply to those units.

With the exception of combustion units, emissions limitations subject to processes are found in **25 Pa. Code §123.13 (*Processes*)**. According to 25 Pa. Code §121.1, a *process* is defined in relevant part as "[a] method, reaction, or operation in which materials are handled or whereby materials undergo…chemical change… The

term includes all of the equipment, operations and facilities necessary for the completion of the transformation of the materials to produce a physical or chemical change." In other words, a process means that a substance with different chemical composition or properties is formed or created. The term includes all of the equipment, operations, and facilities necessary for the completion of the transformation of the materials to produce a physical or chemical change. Gas processing at Harmon Creek includes extracting natural gas liquids and partial fractionation of mixed natural gas liquids to natural gas products using stabilization, cryogenic separation, and de-ethanization fractionation to produce residue gas, condensate, natural gas liquids, and purity ethane.

Certain processes listed in §123.13(b)(1) such as portland cement manufacturing, as an example, have source and process-specific standards of which MarkWest is not subject. Since this facility does not include any of the listed processes in §123.13(b)(1), the processes at this facility are subject to the requirements of §123.13(c)(1)(i), which specifies that no person may permit the emission of particulate matter from a process in a manner that the concentration of particulate matter in the effluent gas exceeds 0.04 grain per dry standard cubic foot when the effluent gas volume is less than 150,000 dry standard cubic feet per minute. All processes at this facility have effluent volumes less than 150,000 dscfm and are subject to this regulation.

Sulfur compound emissions standards are established in **25 Pa. Code §123.21 (*General*)**. The sulfur compound emission standard that is applicable to all sources, unless otherwise subject to a different provision of this article, is found in §123.21(b); this regulation establishes that no person may permit the emission into the outdoor atmosphere of sulfur oxides from a source in a manner that the concentration of the sulfur oxides, expressed as SO_2, in the effluent gas exceeds 500 parts per million, by volume, dry basis. It is expected that the gas will have low sulfur concentrations such that exhaust emissions from all combustion devices will have SO_2 concentrations below 500 ppm.

In accordance with **25 Pa. Code §123.22 (*Combustion units*)**, combustion units in nonair basin areas must conform with an emission limitation not to exceed 4 lbs SO_2/MMBtu/hr of heat input. This facility is not located in an air basin, and the heaters mentioned above under §123.11 are considered combustion units subject to this regulation. All other non-combustion unit air contamination sources are subject to the requirements of §123.21.

Odor emissions are regulated under **25 Pa. Code §123.31 (*Limitations*)** where §123.31(b) specifies that "[a] person may not permit the emission into the outdoor atmosphere of any malodorous air contaminants from any source, in such a manner that the malodors are detectable outside the property of the person on whose land the source is being operated" where a *malodor* is defined in §121.1 as "[a]n odor which causes annoyance or discomfort to the public and which the Department determines to be objectionable to the public."

Visible emissions from sources are regulated under **25 Pa. Code §123.41 (*Limitations*)**, which prohibits the emission of visible air contaminants into the outdoor atmosphere in such a manner that the opacity of the emission is either equal to or greater than 20% for a period or periods aggregating more than 3 minutes in any 1 hour, or equal to or greater than 60% at any time. However, under plan approval PA-63-01011, all air contamination sources and air cleaning devices are subject to an opacity limitation not to equal or exceed 10% at any time per Section C, Condition #007 which supersede the requirements of §123.41. Consequently, although 25 Pa. Code §123.41 applies, it is superseded by a more stringent opacity limitation established under PA-63-01011.

According to **25 Pa. Code §129.57 (*Storage tanks less than or equal to 40,000 gallons capacity containing VOCs*)**, above ground stationary storage tanks with capacities equal to or greater than 2,000 gallons (and less than or equal to 40,000 gallons) which contain volatile organic compounds with vapor pressure greater than 1.5 psia (10.5 kilopascals) under actual storage conditions shall be equipped with pressure relief valves which are maintained in good operating condition and which are set to release at no less than 0.7 psig (4.8 kilopascals) of

pressure or 0.3 psig (2.1 kilopascals) of vacuum or the highest possible pressure and vacuum in accordance with state or local fire codes or the National Fire Prevention Association guidelines.

The actual vapor pressure must be determined per §129.56(g), which specifies that "[f]or volatile organic compounds whose storage temperature is governed by ambient weather conditions, the vapor pressure under actual storage conditions shall be determined using a temperature which is representative of the average storage temperature for the hottest month of the year in which the storage takes place."

This facility has a 4,200-gallon closed drain tank, a 1,430-gallon amine closed drain tank, and two (2) 500-gallon methanol storage tanks. The closed drain tank and the amine closed drain tank emissions, including from pressure relief valves, are routed to the plant flare. This vapor recovery system meets the more stringent requirements of §129.56, and therefore, compliance with §129.57 is met by meeting §129.56.

There are two (2) 500-gallon methanol storage tanks currently on site as well as an additional third methanol tank that was authorized under plan approval PA-63-01011B that is undergoing construction at the time of writing. Since the capacity of the methanol storage tanks as well as for the 1,430-gallon amine closed drain tank are less than 2,000 gallons, those tanks are not subject to the requirements of §129.57.

25 Pa. Code §129.14 (*Open burning*) prohibits open burning within an air basin under section (a), and §129.14(b) prohibits open burning outside of an air basin with certain limited exceptions under section (c) of this regulation such as a fire set to prevent or abate a fire hazard when approved by the Department or clearing and grubbing waste, among others. The limited circumstances in which open burning is allowed cannot interfere with the reasonable enjoyment of life or property or cause damage to vegetation or property, among other potentially harmful effects specified in this regulation. This facility is located outside of an air basin and therefore is prohibited from open burning outside of the specific exceptions noted therein.

25 Pa. Code §135.3 (*Reporting*) requires annual emission statement (AES) inventory reporting of actual emissions if requested by the Department for natural minor facilities and is required for all synthetic minor and Title V facilities. As a facility first authorized under a GP-5, the permittee was required to submit these annual emission statements. The permittee has submitted reports of actual emissions every year since the facility first began operations in 2018, and the permittee shall continue to submit such reports along with the associated recordkeeping requirements of §135.5.

In accordance with **25 Pa. Code §127.441 (*Operating permit terms and conditions*)**, a facility-wide inspection shall be conducted at a minimum of once per day when the facility is operated by the Owner/Operator. This requirement is included in most operating permits and was first required to be conducted at this facility under plan approval PA-63-01011, issued on April 12, 2023. The facility-wide inspection shall be conducted for the presence of the following:

a. Visible stack emissions;
b. Fugitive emissions; and
c. Potentially objectionable odors at the property line.

These observations are to ensure continued compliance with source-specific visible emission limitations, fugitive emissions prohibited under 25 Pa. Code §123.1 or §123.2, and potentially objectionable odors prohibited under 25 Pa. Code §123.31. Observations for visible stack emissions shall be conducted during daylight hours and all observations shall be conducted while sources are in operation. If any visible stack emissions, fugitive emissions, or potentially objectionable odors are apparent, the Owner/Operator shall take corrective action. Records of each inspection shall be maintained in a log and at a minimum include the date, time, name and title of the observer, along with any corrective action taken as a result. These records shall be

kept on site or at an alternative location acceptable to the Department for a period of five years and made available to the Department upon request.

Per **25 Pa. Code §127.441 (*Operating permit terms and conditions*)**, (a) The permittee shall report malfunctions, emergencies, or incidents of excess emissions to the Department. A malfunction is any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. An emergency is any situation arising from sudden and reasonably unforeseeable events beyond the control of the owner or operator of a facility which requires immediate corrective action to restore normal operation, and which causes the emission source to exceed emissions, due to unavoidable increases in emissions attributable to the situation. An emergency shall not include situations caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

(b) When the malfunction, emergency or incident of excess emissions poses an imminent danger to the public health, safety, welfare, or environment, it shall be reported to the Department and the County Emergency Management Agency by telephone within one (1) hour after the discovery of the malfunction, emergency or incident of excess emissions. The owner or operator shall submit a written or emailed report of instances of such malfunctions, emergencies or incidents of excess emissions to the Department within three (3) business days of the telephone report.

(c) The report shall describe the following:

1. name, permit or authorization number, and location of the facility,
2. nature and cause of the malfunction, emergency or incident,
3. date and time when the malfunction, emergency or incident was first observed,
4. expected duration of excess emissions,
5. estimated rate of emissions,
6. corrective actions or preventative measures taken.
7. The 12-month rolling sum of emissions (including, but not limited to, criteria pollutants, VOCs, greenhouse gases, and total HAPs), including any emission increases that occurred as a result of the malfunction event.

(d) Any malfunction, emergency or incident of excess emissions that is not subject to the notice requirements of paragraph (b) of this condition shall be reported to the Department by telephone within 24 hours (or by 4:00 PM of the next business day, whichever is later) of discovery and in writing or by e-mail within five (5) business days of discovery. The report shall contain the same information required by paragraph (c), and any permit specific malfunction reporting requirements.

(e) During an emergency an owner or operator may continue to operate the source at their discretion provided they submit justification for continued operation of a source during the emergency and follow all the notification and reporting requirements in accordance with paragraphs (b)-(d), as applicable, including any permit specific malfunction reporting requirements.

(f) Reports regarding malfunctions, emergencies or incidents of excess emissions shall be submitted to the appropriate DEP Regional Office Air Program Manager.

(g) Any emissions resulted from malfunction or emergency are to be reported in the annual emissions inventory report, if the annual emissions inventory report is required by permit or authorization.

The malfunction reporting requirements described above are included under plan approval PA-63-01011 in Section C, Condition #017, and will also be included in the proposed operating permit.

25 Pa. Code §129.63 (*Degreasing operations*), does not apply to this facility. There are no parts washers or other equipment on site that meet the definition of a *cold cleaning machine* as defined in 25 Pa. Code §121.1. A cold cleaning machine is one that uses more than 2.0 gallons of solvent greater than 5% VOC by weight for the cleaning of metal parts. This regulation specifies work practice standards for the use of this type of equipment.

Effective on August 11, 2018, **25 Pa. Code §129.63a (*Control of VOC emissions from industrial cleaning solvents*)**, applies to the owner or operator of a facility at which an industrial cleaning solvent is used or applied in a cleaning activity at a cleaning unit operation, a work production-related work area or a part, product, tool, machinery, equipment, vessel, floor or wall such as spray booth cleaning as an example. A *cleaning activity* is defined as "the use or application of an industrial cleaning solvent to remove a contaminant, such as an adhesive, ink, paint, dirt, soil, oil or grease, by wiping, flushing, brushing, soaking, dipping, spraying or a similar effort." Gas processing operations at this facility include extracting natural gas liquids (NGLs) from field gas and partial fractionation of mixed NGLs into natural gas products using stabilization, cryogenic separation, and de-ethanization fractionation to produce residue gas, condensate, NGLs, and purity ethane. The processes at this facility do not meet the definition of a cleaning activity at a cleaning unit operation, and therefore, this regulation does not apply.

25 Pa. Code §123.43 (*Measuring Techniques*) applies to the facility. Per this regulation, "Visible emissions may be measured using either of the following: (1) A device approved by the Department and maintained to provide accurate opacity measurements. (2) Observers, trained and qualified to measure plume opacity with the naked eye or with the aid of devices approved by the Department."

25 Pa. Code Chapter 139 establishes requirements for sampling and testing and is applicable to select sources at this facility. The proposed operating permit will require that all source testing be conducted in accordance with the most recent version of the Department's *Source Testing Manual* pursuant to §139.3 as well as any additional requirements specified in applicable Federal Regulations. Pursuant to Code §139.5(f), a person proposing test methods, procedures and guidance for the reporting of emissions different from those contained in the *Source Testing Manual* shall have the burden of proof to demonstrate that test methods, procedures and guidance accurately characterize the emissions from the source. If the Department has cause to believe that air contaminant emissions from the sources listed in the operating permit may exceed the limitations specified in, or established pursuant to this State-Only Operating Permit, the permittee may be required to conduct test methods and procedures deemed necessary by the Department to determine the actual emissions rate.

25 Pa. Code §129.96-§129.100 (*Additional RACT Requirements for Major Sources of NOx and VOCs*) applies reasonably available control technology (RACT) requirements to major sources of NOx and/or VOCs. Since this facility is not a major source of NOx and/or VOCs, this facility was not subject to any presumptive or case-by-case RACT II requirements.

Similarly, **25 Pa. Code §129.111-§129.115 (*Additional RACT Requirements for Major Sources of NOx and VOCs for the 2015 Ozone NAAQS*)** applies additional reasonably available control technology (RACT) requirements to major sources of NOx and/or VOCs for the 2015 ozone national ambient air quality standards (NAAQS). Since this facility is not a major source of NOx and/or VOCs, this facility was not subject to any presumptive or case-by-case RACT III requirements.

25 Pa. Code §129.121-§129.130 (*Control of VOC Emissions from Unconventional Oil and Natural Gas Resources)* applies to an owner or operator of storage vessels, natural gas-driven continuous bleed pneumatic controllers, natural gas-driven diaphragm pumps, reciprocating compressors and centrifugal compressors, and fugitive emissions components at unconventional oil and natural gas sources of VOC emissions installed at an unconventional well site, a gathering and boosting station or a natural gas processing plant in this Commonwealth which were constructed *on or before* December 10, 2022. Air contamination sources and air cleaning devices authorized under GP5-63-01011 and GP5-63-01011A are potentially subject to these

regulations since they were authorized prior to December 10, 2022. Potentially affected facilities at Harmon Creek include storage vessels, reciprocating compressors, centrifugal compressors, and fugitive emissions components.

25 Pa. Code §129.123 (*Storage Vessels*) applies to storage vessels with a potential to emit 2.7 TPY or greater VOC emissions. Since the potential-to-emit (post-control) of any storage vessel at this facility is below 2.7 TPY VOC, this regulation does not apply.

25 Pa. Code §129.124 (*Natural Gas-Driven Continuous Bleed Pneumatic Controllers*) applies to natural gas-driven continuous bleed pneumatic controllers. Since there are no natural gas-driven continuous bleed pneumatic controllers at this facility, this regulation does not apply.

Similarly, **25 Pa. Code §129.125 (*Natural Gas-Driven Diaphragm Pumps*)** applies to natural gas-driven diaphragm pumps. Since there are no Natural gas-driven diaphragm pumps at this facility, this regulation does not apply.

25 Pa. Code §129.126 (*Compressors*) applies to compressors (both reciprocating and centrifugal). Requirements under this section apply to Source 101, the seven (7) electrically driven reciprocating compressors first authorized under GP5-63-01011A and Source 104, four (4) centrifugal dry seal compressor vents. This regulation does not apply to Source 103, three (3) electrically driven reciprocating compressors that were constructed after December 10, 2022. Under 129.126(b) for reciprocating compressors, beginning on December 10, 2023, the owner/operator shall either replace the rod packing on or before 26,000 hours of operation, operated for 26 months, whichever occurs later, or shall route the VOC emissions to a control device using a rod packing emissions collection system. In this instance, reciprocating compressor rod packing emissions are uncontrolled, and MarkWest must follow the applicable rod packing replacement schedule of this regulation, which mirrors the applicable requirements of 40 CFR Part 60 Subparts OOOOa and OOOOb. For centrifugal compressors, although this regulation applies, there are no effective requirements under this section since requirements only apply to wet seals. MarkWest currently has four (4) centrifugal compressor dry seal vents at this facility.

25 Pa. Code §129.127 (*Fugitive Emissions Components*) applies to fugitive emissions components, which in this case, is Source 701, Fugitives. Under 129.127(e), the owner or operator of a natural gas gathering and boosting station or a natural gas processing plant shall conduct an initial AVO inspection on or before February 8, 2023, with monthly inspections thereafter separated by at least 15 calendar days but not more than 45 calendar days and shall conduct an initial LDAR inspection program on or before February 8, 2023, with quarterly inspections thereafter separated by at least 60 calendar days but not more than 120 calendar days. In addition, per §129.127(g), MarkWest must develop a fugitive emissions monitoring plan that covers the collection of fugitive emissions components at the subject facility. MarkWest has demonstrated compliance with the requirements of this regulation, as MarkWest conducts monthly AVO inspections, quarterly LDAR inspections, and has developed a fugitive emissions monitoring plan for this facility.

25 Pa. Code §129.128 (*Covers and Closed Vent Systems*) applies to covers and closed vent systems on any affected storage vessel, reciprocating compressor, or centrifugal compressor. Since there are no affected storage vessels or closed vent systems on affected reciprocating or centrifugal compressors, this regulation does not apply.

25 Pa. Code §129.129 (*Control Devices*) applies to the owner or operator of each control device that receives a liquid, gas, vapor, or fume from a source subject to §129.123(b)(1)(iii), §129.125(b)(1)(ii) or (c)(1), or §129.126(b)(2) or (c)(2) (relating to storage vessels; natural gas-driven diaphragm pumps; and compressors). Since none of the affected sources under this regulation are controlled by the plant flare, this regulation does not apply.

25 Pa. Code §129.130 (*Recordkeeping and Reporting*) specifies recordkeeping requirements for affected facilities under this section, which includes the reciprocating compressors, centrifugal compressors, and fugitive emissions components.

GP-5 Requirements:

The following outlines the various sections of the GP-5 and its potential applicability to air contamination sources at this facility.

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

There are currently no glycol dehydration units 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 at this facility.

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

Per the 2018 version of the GP-5, Section A, Condition 3[5], a *reciprocating compressor* is defined as "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 modifications to them have been proposed. All reciprocating compressors, regardless of fuel type and installation date, are subject to Section D (i.e. electrically driven or natural gas-fired).

Per Section D Condition 1, which references 40 CFR §60.5385a (of 40 CFR Part 60 Subpart OOOOa), 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.

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 operated during the reporting period must be included in the emissions inventory report [of 25 Pa. Code §135.3], including any potential emissions from scheduled or unscheduled blowdowns.

GP-5 Section E – *Requirements for Storage Vessels*:

The two (2) 500-gallon methanol tanks are expected to emit no more than 0.35 TPY of both VOC and HAPs (0.175 TPY each) and are not subject to the requirements of Section E of the 2018 version of the GP-5. From the review memorandum of plan approval PA-63-01011, "…MarkWest stated that analysis was performed on

[5] Incorporates the definitions established in 40 CFR Part 60 Subpart OOOOa, by reference.

the 4,200-gallon Amine [and deionized] water storage tank and emissions were expected to be insignificant. The emissions from this tank [are] expected to be insignificant, and [are] not subject to Section E."

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

Per Section F(1)(a) of the 2018 version of the GP-5, "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…" use a vapor balancing system and conduct an annual leak inspection or control VOC emissions by at least 95%. Loading losses from truck loadout operations are controlled by the existing open flare.

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

Fugitive emission components at this facility are subject to the leak detection and repair (LDAR) requirements of Section G of the 2018 version of the GP-5. Prior Department reviews noted that the increase in capacity for the heaters was not considered a physical modification, and therefore, the components are subject to Section G(1)(a) which applies to each fugitive emissions component constructed and authorized to operate by the Department on or after February 2, 2013, but prior to August 8, 2018. These requirements include monthly audible, visual, and olfactory (AVO) inspections as well as initial (within 180 days after initial startup) and subsequent quarterly leak detection and repair monitoring (LDAR) using a monitoring device approved by the Department for the detection of fugitive leaks.

However, in addition to the GP-5 requirements, plan approval PA-63-01011 did impose equally stringent and more stringent AVO and LDAR frequencies for certain fugitive emission component types. These include the following summarized requirements:

- Monthly AVO inspections for all emission sources;
- Daily AVO inspections on all fugitive emission component types;
- Weekly AVO inspections on pump components;
- Quarterly LDAR for compressor and connector components using an OGI camera as well as the use of a gas leak detector annually;
- Quarterly LDAR for pressure relief and valve components;
- Monthly LDAR for pump component types.

The plan approval did allow for the owner or operator to request, in writing, an extension of the LDAR inspection interval from the Air Program Manager of the Southwest Regional Office.

For the purposes of this operating permit, a leak is defined as:

(1) Any positive indication of any release of gaseous hydrocarbons, whether audible, visual, or odorous, determined during an AVO inspection;
(2) Any visible emissions detected by an OGI camera calibrated according to 40 CFR §60.18 and a detection sensitivity level of 60 grams/hour; or
(3) A concentration of 500 ppm calibrated as methane or greater detected by an instrument reading.
(4) Any equipment or component that is designed to protect the equipment or safety of personnel is not considered a "leak".

A release from any equipment or component designed by the manufacturer to protect the equipment, controller, personnel, to prevent ground water contamination, gas migration, or an emergency is also not considered a leak.

The owner or operator may use any gas detection device approved by the Department to detect leaks.

If any leak is detected, MarkWest 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 with associated records.

Recordkeeping requirements include a fugitive emissions monitoring plan in accordance with 40 CFR §60.5397a(b) through (d). 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 definition of a leak. 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.

Plan approval PA-63-01011 determined that MarkWest meets BAT by implementing an LDAR program that performs AVO inspections once per shift, monthly Method 21 monitoring of pumps, and quarterly Method 21 monitoring of other component types.

In addition, MarkWest implements the Texas Commission on Environmental Quality (TCEQ) 28VHP LDAR program with reductions found in APDG 6422v2, Revised 07/2022. The LDAR program implemented requires quarterly monitoring of components and welded or flanged piping 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. Harmon Creek was constructed in accordance with AWS D1.1 which specifies welding code. By following code, and by welding and flanging piping to certain standards (apart from screwing connections for piping less than 2-inches in 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.

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 compressed 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 pumps are compressed air-driven.

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

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

This facility operates an existing 8,134 MMBtu/hr John Zink EEF Series air-assisted open flare which was proposed in the original GP-5 application under the 2015 version of the GP-5. The flare is estimated to have a 100% capture efficiency for the sources venting to it and a 98% destruction efficiency of hydrocarbons (VOCs and HAPs). Under the 2015 version of the GP-5 that was used to first permit this facility, open flares were not prohibited. Under the current 2018 version of the GP-5, 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." The revised general permits allow for the operation of open flares, and only new or modified permanent flaring operations authorized under the use of a GP-5 shall be enclosed, unless one of the following criteria is met:

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.

Per 25 Pa. Code §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. Per this application, no new or existing sources are being routed to the flare or are being modified. Because of this, and because the flare is not being physically modified, the flare is not considered to be modified and is therefore allowed to continue operating at this facility.

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

In the review memorandum 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 air-assisted open plant flare. After initial construction, this facility has four (4) pig launchers that are 12", 10", 20", and 24" in size, respectively, as well as one (1) 20" pig receiver. The previous equipment indicated in the January 12, 2018, exemption determination were based on estimates prior to initial construction of the facility.

Although previously exempted, the current GP-5 Section K 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 which may include, but are 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 as appropriate. 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 of the GP-5. In addition, MarkWest is required to record the number of pigging events occurring and the volume of liquids cleared, among other recordkeeping requirements, and must include emissions from pigging operations in their annual AES emission reports.

The launchers and receivers at this facility route to the existing open air-assisted flare that achieves a 98% control efficiency and utilize pig ramps and grounded steel receptacles, all of which meet GP-5 requirements.

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

The applicant has a combined six (6) regen heaters and HMO heaters on site (Sources 031-037, excluding 032) all fueled by natural gas. The term "heater" is somewhat of a misnomer in this context, as heaters typically heat

by direct heat transfer, whereas the regen and HMO heaters at this facility meet the definition of a combustion unit/boiler since they heat by indirect heat transfer.

Four (4) of these "heaters" (i.e. combustion units) were first granted approval and constructed under the 2004 version of GP-1 under GP1-63-01011A (Sources 031, 033, 034, and 036) and a fifth combustion unit was authorized under RFD-63-01011A (Source 035) at lower rated capacities than what are currently permitted, as an increase in capacity was authorized under GP5-63-01011B as described earlier in this document.[6] Source 037 was authorized under GP5-63-01011B.

As noted, this facility currently has installed the following combustion units:

- Source 031, the 11.84 MMBtu/hr Cryo Plant 1 Regen Heater (H-1711) authorized under the 2004 version of the GP-1.
- Source 033, the 48.15 MMBtu/hr De-Ethanizer HMO Heater 1 (H-1767) authorized under the 2004 version of the GP-1.
- Source 034, the 48.15 MMBtu/hr De-Ethanizer HMO Heater 2 (H-1768) authorized under the 2004 version of the GP-1.
- Source 035, the 6.60 MMBtu/hr De-Ethanizer Regen Heater 2 (H-1775) authorized under RFD.
- Source 036, an 11.99 MMBtu/hr Stabilization HMO Heater (H-1769) authorized under the 2004 version of the GP-1 .
- Source 037, a 17.84 MMBtu/hr Cryo Plant 2 Regen Heater (H-2711) authorized under GP5-63-01011B.

Since GP5-63-01011B authorized an increase in capacity of the five existing combustion units (at that time) and authorized a new combustion unit (Source 037), this modification resulted in the existing units being subject to the applicable BAT requirements of Section L of the 2018 version of the GP-5.

These requirements include the following:

- Each unit shall have a rated heat input less than 50 MMBtu/hr each and only be fired on natural gas.
- For units rated above 10.0 MMBtu/hr, meet the following emission limitations:

Table IV:
2018 GP-5 Emission Limitations for Combustion Units

Constructed or Modified After:	NOx (ppmvd @ 3% O_2)	CO (ppmvd @ 3% O_2)	PM (lbs/MMBtu)	Opacity (No more than 3 min/hr)	Opacity (At any time)
December 2, 1995	30	300	0.4	20%	60%
August 8, 2018	30	130	0.4	10%	30%

Sources 031, 033, 034, and 036 are subject to the limitations for sources authorized after August 8, 2018, shown in the table above, including the 30 ppmvd NOx, 130 ppmvd CO, 0.4 lbs/MMBtu, and the 10% and 30% opacity limitations, though the opacity limitations are superseded by a 10% opacity limitation at all times from plan approval PA-63-01011.

The permittee is required to conduct either a performance test for NOx and CO within 180 days of reauthorization of the GP-5 (*or state-only operating permit in this case*) **or** conduct periodic monitoring (i.e. portable analyzer testing) in accordance with the 2018 version of the GP-5, Section L(1)(b)(iii) for Sources 031, 033, 034, and 036. The operator may choose to conduct performance testing within 180 days of authorization (or reauthorization) of this state-only operating permit in lieu of conducting periodic monitoring **or** may choose to conduct periodic monitoring in lieu of performance testing.[7] It should be noted that Section L of the 2018 version of the GP-5 does not explicitly specify a frequency for periodic monitoring, but it is presumed to occur at the same frequency as performance testing, or 180 days after authorization. For clarity, proposed conditions

[6] Though additional units were authorized under the original GP1-63-01011A authorization, not all were built. A revision of the GP-1 occurred in January 2023, though the 2004 version was applicable at the time of authorization of the use of the GP-1 in 2018.
[7] The reviewer would like to note that the most recent version of the GP-1 (01/2023) would not require performance testing within 180 days of reauthorization for these sources.

in the state-only operating permit will specify that for performance testing or for periodic monitoring, it is to occur on a five-year basis from the date of the previous test or periodic monitoring rather than being based on 180 days after each (re)authorization of the state-only operating permit.

Section B(2)(b) of the 2023 version of the GP-1 requires periodic monitoring for NOx and CO on a three-year basis (at the 30 ppm NOx and 130 ppm CO emission limits). Although no combustion units at this facility were or currently are authorized under the 2023 version of the GP-1, BAT for Source 037 under plan approval PA-63-01011A borrows from the GP-1 and includes a requirement to conduct periodic monitoring on a three-year basis for Source 037.

The GP-1 does not require performance testing for gas-fired units less than 50.0 MMBtu/hr, and consequently, subsequent performance testing is not required under the GP-1 unless periodic monitoring fails to demonstrate compliance with applicable emission limitations. Hence, if the measured NOx or CO emissions concentrations from periodic monitoring (portable analyzer) exceed the respective NOx and CO emissions limitations, the owner or operator must conduct a performance test (stack test) within 180 days of the date when the periodic monitoring occurred. The most recent version of the GP-1 (01/2023) does not require performance testing within 180 days of reauthorization for these sources.

If the measured NOx or CO emissions concentrations from periodic monitoring (portable analyzer) exceed the emissions limit, the owner or operator must conduct a performance test (stack test) within 180 days of the periodic monitoring.

- Source 031 (H-1711) was tested on April 24, 2019. At that time, the source was rated at 10.25 MMBtu/hr.
- Source 033 (H-1767) was tested on April 24, 2019, and on October 23, 2020. At that time, the source was rated at 41.22 MMBtu/hr.
- Source 034 (H-1768) was tested on April 23, 2019, and on October 23, 2020. At that time, the source was rated at 41.22 MMBtu/hr.
- Source 035 (H-1775) was tested on April 23, 2019. At that time, the source was rated at 5.79 MMBtu/hr rather than 6.60 MMBtu/hr.
- Source 36 (H-1769) was tested on May 24, 2019. At that time, the source was rated at 10.37 MMBtu/hr rather than 11.99 MMBtu/hr.
- Source 037 (H-2711) was tested on July 17, 2024.

Source 035 is required to only be natural gas-fired and is not required to undergo performance testing, periodic monitoring, or an annual tune up/inspection since the combustion unit has a rated heat input capacity less than 10.0 MMBtu/hr per Section L of the 2018 GP-5.

Per the 2018 version of the GP-5, the permittee is also required to conduct a tune up/inspection within 180 days of reauthorization of a GP-5 (*or state-only operating permit in this instance*) for all combustion units except for Source 035 since it is rated below 10.0 MMBtu/hr.

The Department has created a source group in Section E of the proposed operating permit for Sources 031, 033, 034, and 036. Source 035 will have a source-specific condition that requires using only natural gas as fuel. Source 037 has plan approval-specific requirements that will be carried over into the proposed operating permit. The following conditions are included in this source group:

> **(1.)** For each small combustion unit (< 100 MMBtu/hr) constructed and authorized to operate under this state-only operating permit, the owner or operator shall conduct a tune-up/inspection on the small combustion unit within 180 days of authorization of this state-only operating permit and within five (5) calendar years from the date of the previous tune-up/inspection. At a minimum the tune-up/inspection shall consist of the following:

(i) As applicable, inspect the burner, and clean or replace any components of the burner as necessary;
(ii) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available;
(iii) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly;
(iv) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with the NOx requirement to which the small combustion unit is subject.

(2.) For each small combustion unit (< 100 MMBtu/hr) constructed and authorized to operate under this state-only operating permit, the owner or operator shall, **within 180 days after authorization of this state-only operating permit**, conduct either a performance test or periodic monitoring.

At a minimum frequency of **once every five (5) calendar years from the date of the previous performance test or periodic monitoring**, the owner or operator shall measure the concentrations in the effluent stream of NOx and CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable analyzer as long as it is calibrated and operated according to the manufacturer's recommendations, the procedures specified in ASTM D-6522, and the following requirements:

(i) The portable analyzer shall undergo factory laboratory calibration and cleaning every three years.
(ii) The portable analyzer shall have on-site calibration checks using certified calibration gases demonstrating the analyzer accuracy requirements specified in ASTM D-6522.
(iii) In order to verify emissions, the owner or operator shall conduct three, 20-minute test runs recording emissions data at least once each minute.
(iv) Depending on concentrations observed, fresh air purges should be performed according to manufacturer's recommendations.
(v) Re-zeroing of the portable analyzer should be performed according to manufacturer's recommendations or at least before every test run.

A performance test may be used in lieu of periodic monitoring.

(3.) For each combustion unit, the owner or operator shall maintain the following records, including information on:

(a) The tune-up/inspection records, which shall at a minimum include:

(i) The concentrations of NOx and CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the small combustion unit;
(ii) A description of any corrective actions taken as part of the tune-up;
(iii) The date(s) the annual tune-up/inspection was conducted;
(iv) The factory calibration certification sheets for the portable analyzer; and
(v) The type and amount of fuel used over the 12 months prior to the tune-up; and

(b) The emissions calculations for the combustion unit in accordance with 25 Pa. Code §135.5.

(4.) (a) When conducting periodic monitoring on a combustion unit, the owner or operator may follow the procedures below. If the owner or operator decides to deviate from those procedures, they must submit a request to use an alternate procedure, in writing, at least 60 days prior to performing the periodic monitoring. In the alternate procedure request, the owner or operator must demonstrate the alternate procedure's equivalence to the standard procedure to the satisfaction of the Division of Source Testing and Monitoring.

(b) Standardized Periodic Monitoring Procedure.

(i) Conduct three test runs of at least 20-minutes duration within 10% of 100% peak (or the highest achievable) load.

(ii) Determine NOx and CO emissions and O_2 concentrations in the exhaust with either an electro-chemical cell portable gas analyzer used and maintained in accordance with the manufacturer's specifications and following the procedures specified in the current version of ASTM D6522 or by following the procedures in this section.

(iii) If the measured NOx or CO emissions concentrations are in exceedance of the emissions limit, the owner or operator must perform a stack test within 180 days of the periodic monitoring.

(iv) Periodic monitoring for each combustion unit shall be conducted within 180 days of authorization of this state-only operating permit and at a minimum frequency of once **every five (5) calendar years thereafter**. A performance test may be used in lieu of periodic monitoring.

(5.) The Owner/Operator shall not permit the emission into the outdoor atmosphere of visible air contaminants from a combustion unit in such a manner that the opacity of the emission is equal to or greater than 10% for a period or periods aggregating more than 3 minutes in any 1 hour in accordance with PA-63-01011.

The permittee shall ensure the combustion unit meets the visible emissions standards as determined by the methods described in 25 Pa. Code §123.43.

As a general requirement that will apply to the combustion units, all air contamination sources associated air cleaning devices are to be operated in such a manner as not to cause air pollution, operated and maintained in a manner consistent with good operating and maintenance practices, and operated and maintained in accordance with the manufacturer's specifications and the applicable terms and conditions of this [general permit *or state-only operating permit in this case*].

In summary, the permittee is required to conduct either a performance test **or** periodic monitoring within 180 days of authorization and within 180 days of each potential state-only operating permit renewal, if such approvals are authorized by the Department. Subsequent periodic monitoring after the 180-day initial test is required at a minimum of once every five years. The units are limited to 30 ppmvd NOx, 130 ppmvd CO, 0.4 lbs/MMBtu PM, and would otherwise be subject to 10% opacity for any three minutes in one hour or not to exceed 30% at any time but is superseded by the facility-wide opacity limitation of 10% at any time per PA-63-01011A. A performance test would be required within 180 days of the date of periodic monitoring if the periodic monitoring does not indicate compliance with permitted emission limits. A performance test may be used in lieu of periodic monitoring at any time. An annual tune-up is also required.

Source 037 has source-specific requirements from plan approval PA-63-01011. This source is subject to the following emission limitations: 9 ppmdv NOx at 3% O_2 and 49 ppmdv CO at 3% O_2 that were established as BAT and 0.4 lbs PM/MMBtu per 25 Pa. Code §123.11. The unit is also subject to a facility-wide opacity limitation of 10% at any time per PA-63-01011A.

Plan approval requirements will be included in the proposed state-only operating permit for this source. These requirements include, but are not limited to, conducting an annual tune up/inspection, maintaining records of fuel consumption on a monthly basis, measuring the concentrations in the effluent stream of NOx and CO in parts per million, by volume, before and after the adjustments are made (may use a portable analyzer) every three years or within a timeframe extended by the Department.

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.

Federal Regulatory Analysis:

New Source Performance Standards (NSPS):

Title 25, Chapter 122 of the Pennsylvania Code adopts the New Source Performance Standards (NSPS) promulgated by the United States Environmental Protection Agency under the Clean Air Act (42 U.S.C.A. §§7401—7642) in 40 CFR Part 60. These standards regulate the construction of new or modifications to existing stationary sources and have been adopted by the Department to implement a delegation of Federal authority under Section 111(c) of the Clean Air Act (42 U.S.C.A. §7411). The applicability of an NSPS Subpart depends on the type of source and date of construction, reconstruction, or modification as these terms are defined in the General Provisions of the NSPS in 40 CFR Part 60 Subpart A or as specifically defined in the associated subpart. With respect to the air contamination sources at Harmon Creek, the following NSPS are potentially applicable:

- 40 CFR Part 60 Subpart Db—*Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units*
- 40 CFR Part 60 Subpart Dc—*Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*
- 40 CFR Part 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, and On or Before October 4, 2023*
- 40 CFR Part 60 Subpart KKK—*Equipment Leaks of VOC From Onshore Natural Gas Processing Plants, and on or Before August 23, 2011*
- 40 CFR Part 60 Subpart LLL—*Standards of Performance for SO_2 Emissions From Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011*
- 40 CFR Part 60 Subpart OOOO—*Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After August 23, 2011, and on or before 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 and On or Before December 6, 2022*
- 40 CFR Part 60 Subpart OOOOb—*Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After December 6, 2022*
- 40 CFR Part 60 Subpart OOOOc—*Emissions Guidelines for Greenhouse Gas Emissions from Existing Crude Oil and Natural Gas Facilities*
- 40 CFR Part 60 Subpart JJJJ—*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*
- 40 CFR Part 60 Subpart IIII—*Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*

Per §60.1(a) of **40 CFR Part 60 Subpart A—*General Provisions***, the provisions of 40 CFR Part 60 apply to the owner or operator of any stationary source which contains an affected facility of which the construction or modification commenced after the date of publication in this part of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility. For the purposes of Part 60, an *affected facility* means "with reference to a stationary source, any apparatus to which a standard is applicable." The affected facility to which a standard (or Subpart) applies is specifically defined within each subpart. Part 60 Subpart A specifies general regulatory provisions, including but not limited to, definitions, notification and recordkeeping requirements, and performance testing requirements, which apply in each of the subsequent Part 60 subparts.

The requirements of **40 CFR Part 60 Subpart Db—*Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units*** do not apply to the regenerative heaters or deethanizers at Harmon Creek. Per 40 CFR §60.40b, the affected facility to which this subpart applies is each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 megawatts (MW) (100 MMBtu/hr). Although the heaters meet the definition of a *steam generating unit* under 40 CFR §60.41b as "a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium…", since each unit does not have a rated heat input capacity greater than 29 megawatts (100 MMBtu/hr), each heater is not an affected facility under Subpart Db.

The requirements of **40 CFR Part 60 Subpart Dc— *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*** apply to the regenerative heaters and the hot medium oil deethanizers at Harmon Creek (Sources 031, 033-034, 036-037).

Per 40 CFR §60.40c, an affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction commenced after June 9, 1989, and that has a maximum design heat input capacity of 29 MW (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr).

Per 40 CFR §60.41c, a *steam generating unit* is defined as, "a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium…" This definition excludes process heaters as defined under this Subpart. MarkWest has argued that the heaters meet the definition of a process heater and should be excluded from meeting the requirements of this Subpart; however, the Department disagrees with this assertion.

Under 40 CFR § 60.41c, a *process heater* is defined as "…a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst." According to the process flow narrative provided in the application for plan approval PA-63-01011B, MarkWest describes:

> *The removal of the entrained water works by passing the gas through a tower packed with material that has a high affinity for water so that the water is removed from the gas stream by absorbing into the media. Three towers of each unit are used in parallel with two receiving gas while the third is being regenerated. The regenerative heaters are used to heat dry natural gas which desorbs the water from the media thus regenerating the tower and making it available for dewatering of the inlet gas. The gas used for regeneration is then cooled to condense the water and remove it from the system, after which the gas is re-routed to the inlet of the plant for processing.*

This process is similar for the current equipment on site. Since the natural gas heated by the regenerative heaters does not initiate or promote a chemical reaction (in which the gas participates as a reactant or catalyst), the regenerative heaters do not meet the definition of a *process heater* and are therefore considered *steam generating units* subject to the applicable requirements of 40 CFR Part 60 Subpart Dc.

Since each heater and deethanizer has a rated heat input capacity between 10 MMBtu/hr and 100 MMBtu/hr per §60.40c, each unit is considered an affected facility under Subpart Dc. The proposed heaters are subject to limited reporting and recordkeeping requirements pursuant to §60.48c that will be included in the proposed state-only operating permit.

Source 035, the deethanizer regen heater (H-1775), has a rated heat input of 6.60 MMBtu/hr, and is therefore excluded from needing to meet the requirements of this subpart since it is rated at less than 10.0 MMBtu/hr.

The owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include the design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

The owner or operator shall comply with the recordkeeping and certification requirements in accordance with 40 CFR §§60.46c(e), 60.42c(h) and 60.48c(f)(l) (i.e. the permittee may use the fuel supplier certification to demonstrate compliance). The owner or operator shall maintain daily fuel consumption records in accordance with 40 CFR §60.48c(g).

40 CFR Part 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 the storage tanks at Harmon Creek. Per 40 CFR §60.110b, the requirements of 40 CFR Part 60 Subpart Kb, apply to "…each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984." Additionally, per §60.110b(d), "This subpart does not apply to "…[v]essels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer…"

For the purposes of Subpart Kb, the term *condensate* is defined as "hydrocarbon liquid separated from natural gas that condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions." The term *volatile organic liquid (VOL)* is defined as "any organic liquid which can emit volatile organic compounds (as defined in 40 CFR 51.100) into the atmosphere."

The previously installed 4,200-gallon closed drain tank and 1,430-gallon amine tank at Harmon Creek has an equivalent capacity of approximately 15.89 m^3 and 5.41 m^3, respectively. The closed drain tank temporarily stores liquids containing condensate prior to custody transfer to tanker trucks. Although the storage tanks were constructed after July 23, 1984, since the tanks have a capacity of less than 1,589.874 m^3 (or 420,000 gallons), the requirements of 40 CFR Part 60 Subpart Kb do not apply.

Harmon Creek also has two (2) 500-gallon methanol storage tanks. Since the capacity of these ancillary storage tanks are less than 75 m^3 (or 19,812 gallons), the requirements of 40 CFR Part 60 Subpart Kb do not apply.

The requirements of **40 CFR Part 60 Subpart KKK—*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*** do not apply to Harmon Creek. Per 40 CFR §60.630(a)(1), Subpart KKK applies to affected facilities in onshore natural gas processing plants that commenced construction, reconstruction, or modification after January 20, 1984, and on or before August 23, 2011. Harmon Creek was not constructed, reconstructed, or modified after January 20, 1984, and on or before August 23, 2011, since it did not receive initial authorization until January 18, 2018, and as such, this Subpart does not apply.

The requirements of **40 CFR Part 60 Subpart LLL—*Standards of Performance for SO_2 Emissions From Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011*** do not apply to Harmon Creek. Per 40 CFR §60.640(a), Subpart LLL applies to each sweetening unit or one followed by a sulfur recovery unit that process natural gas. Per §60.641, a *sweetening unit* is a process device that separates the H_2S (hydrogen sulfide) and CO_2 (carbon dioxide) contents from the sour natural gas stream. A *sulfur recovery unit* is a process device that recovers elemental sulfur from acid gas. Although Harmon Creek incorporates an amine unit which removes CO_2 from process gas, it is not considered an affected facility under this Subpart since this facility does not process sour gas and nor was it constructed after January 20, 1984, and on or before August 23, 2011.

The requirements of **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*** do not apply at Harmon Creek since it does not incorporate any onshore affected facilities that commenced construction, modification or reconstruction after August 23, 2011, and on or before 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 and on or before December 6, 2022* 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_2) 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 and on or before December 6, 2022. 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 air contamination sources at Harmon Creek are discussed below. Broadly, Subpart OOOOa applies to air contamination sources that were constructed prior to authorization under PA-63-01011 that had not undergone modification.

(a) *Well Affected Facilities* – A *well affected facility* is a single well that conducts a well completion operation following hydraulic fracturing or refracturing. There are no well affected facilities at Harmon Creek.

(b) *Centrifugal compressors* – 40 CFR §60.5430a defines a *centrifugal compressor* as "any machine for raising the pressure of a natural gas by drawing in low pressure natural gas and discharging significantly higher pressure natural gas by means of mechanical rotating vanes or impellers." Each centrifugal compressor affected facility is considered a single centrifugal compressor using wet seals and excludes centrifugal compressors 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 no centrifugal compressors at this facility that are considered OOOOa-affected centrifugal compressors under this subpart; however, two (2) centrifugal compressors associated with Harmon Creek 2 are subject to the standards of 40 CFR Part 60 Subpart OOOOb. MarkWest indicated to the Department that the dry seal vents are routed to closed vent system on all centrifugal compressors.

(c) *Reciprocating Compressors* – 40 CFR §60.5430a defines a *reciprocating compressor* as "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 seven (7) electrically powered reciprocating compressors associated with Harmon Creek 1 are Subpart OOOOa-affected facilities, while the remaining three (3) electrically driven reciprocating compressors associated with Harmon Creek 2 are subject to the standards of 40 CFR Part 60 Subpart OOOOb.

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), MarkWest 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.

(d) *Pneumatic Controllers* – All pneumatic controllers currently installed and operating at this facility are air-actuated, and since they are not natural gas-driven pneumatics, they are not considered affected facilities under this Subpart.

(e) *Storage Tanks/Storage Vessels* – This section applies to a single storage vessel or a storage vessel battery (two or more connected storage vessels) that commenced construction, reconstruction, or modification after September 18, 2015, and prior to November 16, 2022, if its potential for VOC emissions is equal to or greater than 6.0 TPY. There are no storage vessels or storage vessel batteries at this facility that have a potential-to-emit that equals or exceeds 6.0 TPY of VOC, and therefore there are no OOOOa-affected units under this Subpart.

(f) *The group of all equipment within a process unit* – 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..."

Harmon Creek includes equipment to extract natural gas liquids from field gas (separators and fractionation equipment), and therefore, the site is considered a gas processing plant subject to the leak detection and repair (LDAR) requirements of this Subpart.

MarkWest is required to monitor and repair all fugitive emission 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. MarkWest has stated in their application that the entire Harmon Creek facility will comply with the Subpart OOOOb process unit equipment standards, and therefore, the applicable OOOOa requirements (specifically related to the group of all equipment within a process unit) for this affected facility will not be included in the proposed operating and will be superseded by OOOOb.

(g) *Sweetening Units* — Per §60.5430a*, a sweetening unit* is defined as "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_2S) 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 amine unit at this facility removes CO_2 from the gas, not H_2S, and this facility does not process sour gas. H_2S emissions are dependent upon the sulfur content of the gas. Little to no sulfur has been detected in the gas, and therefore, no associated H_2S 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_2S 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_2S expressed as sulfur." Since this facility does not have any equipment meeting the definition of a sweetening unit, there are no sweetening unit-affected facilities under this Subpart.

(h) *Pneumatic Pumps* – Each pneumatic pump affected facility is considered a single natural gas-driven diaphragm pump. There are no natural gas-driven pneumatic pumps at this facility, and therefore, there are no pneumatic pump affected facilities under this Subpart.

(i) *The Collection of Fugitive Emissions Components at a Well Site* – There are no well sites at this facility, and therefore, there are no well site affected facilities subject to the requirements of this Subpart.

(j) *The Collection of Fugitive Emissions Components at a Compressor Station* – The collection of fugitive emissions components at a compressor station, as defined in §60.5430a, is an affected facility. For purposes of §60.5397a, a "modification" to a compressor station occurs when: (1) an additional compressor is installed at a compressor station; or (2) one or more compressors at a compressor station is replaced by one or more compressors of greater total horsepower than the compressor(s) being replaced. Harmon Creek is considered an onshore natural gas processing plant and does not have on the property nor is adjacent to a compressor station under common control. Consequently, there are no fugitive emission components at a compressor station that are affected facilities under this Subpart. However, fugitive emission components are subject to requirements under *(f) the group of all equipment within a process unit*.

40 CFR Part 60 Subpart OOOOb — *Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After December 6, 2022*

Per 40 CFR §60.5360b, this subpart establishes emission standards and compliance schedules for the control of greenhouse gases (GHG) (through standards in the form of limitations on methane emissions), volatile organic compounds (VOC), and sulfur dioxide (SO_2) emissions in the crude oil and natural gas source category that commence construction, modification, or reconstruction after December 6, 2022. The crude oil and natural gas source category includes "natural gas production, processing, transmission, and storage..." per 40 CFR §60.5430b, and therefore, this subpart applies to this facility. 40 CFR 5365b(a-j) describes potentially applicable affected facilities under this Subpart.

(a) *Well Affected Facilities* – A *well affected facility* is a single well that conducts a well completion operation following hydraulic fracturing or refracturing. There are no well affected facilities at Harmon Creek.

(b) *Centrifugal Compressors* – Per §60.5365b(b), Subpart OOOOb applies to each *centrifugal compressor affected facility* constructed or modified after December 6, 2022. Each centrifugal compressor affected facility is considered a single centrifugal compressor using wet seals. Two (2) centrifugal compressors associated with Harmon Creek 2 are subject to the standards of 40 CFR Part 60 Subpart OOOOb since plan approval PA-63-01011 was authorized on April 12, 2023, which is after the applicability date of December 6, 2022.

Each centrifugal compressor must comply with the applicable standards upon startup per 40 CFR §60.5370b(a). Per 40 CFR §60.5370b(a), each centrifugal compressor affected facility that uses dry seals must comply with §60.5380b(a)(6 through 8) (limits the volumetric flow rate from a seal vent to 10 scfm and requires scheduled seal replacements if flow rates exceed 10 scfm) or with one of the alternatives in paragraph §60.5380b(a)(9) (requires reducing methane and VOC emissions from each centrifugal compressor dry seal system by 95.0 percent). MarkWest has elected to comply with the alternative requirements of §60.5380b(a)(9) and will equip each centrifugal compressor dry seal system with a cover that meets the requirements of §60.5411b(b) connected through a closed vent system that meets the requirements of §60.5411b(a) and (c). The closed vent system will be routed to a process, or to a control device (facility emergency flare) that meets the conditions specified in §60.5412b.

(c) *Reciprocating Compressors* – Subpart OOOOb applies to each *reciprocating compressor affected facility* constructed or modified after December 6, 2022, which, per 40 CFR §60.5365b(c), is a single reciprocating compressor. Three (3) of the electrically driven compressors associated with Harmon Creek 2 are subject to the standards of 40 CFR Part 60 Subpart OOOOb. The reciprocating compressor affected facilities must meet, per the specified schedules, either the standard or alternate requirements of §60.5385b, as selected by MarkWest, and as specified in §60.5410b(e).

There are four potential methods of compliance with this section that MarkWest may choose. One potential method of compliance under 40 CFR §60.5385b(a) is to maintain the volumetric flow rate of each cylinder to 2 scfm or less, with measurements taken either on or before 8,760 hours of operation after the previous measurement or on or before 8,760 hours of operation after last rod packing replacement, whichever date is *later*, with rod packing repair or replacement within 90 calendar days if the measurement(s) exceed 2 scfm.

MarkWest may also elect to determine the volumetric flow rate per cylinder from each reciprocating compressor in operating or standby pressurized mode (regardless of whether or not each compressor is equipped with an open-ended vent line) and screen for leaks or emissions using the methods in 40 CFR §60.5386b(a).

For conducting measurements on manifolded groups of reciprocating compressor affected facilities, MarkWest can determine the volumetric flow rate from reciprocating compressor rod packing vent by either (1) measuring at a single point in the manifold downstream of all compressor vent inputs and, if practical, prior to comingling with other non-compressor emission sources or by (2) determining the volumetric flow rate per cylinder at standard conditions from the common stack.

As an alternative to complying with the GHG and VOC standards of these methods, MarkWest may use a rod packing emissions collection system that is operated to route the rod packing emissions to a process, reduce methane and VOC emissions from each rod packing emissions collection system by using a control device that reduces methane and VOC emissions by 95.0 percent, or, as an alternative to conducting the required volumetric flow rate measurements, MarkWest can demonstrate compliance by replacing the rod packing on or before 8,760 hours of operation after the previous flow rate measurement, or on or before 8,760 hours of operation after the date of the most recent compressor rod packing replacement, whichever date is later.

(d) *Process Controllers* – Subpart OOOOb applies to each *process controller affected facility* constructed or modified after December 6, 2022, which, per 40 CFR §60.5365b(d), is the "collection of natural gas-driven process controllers at…an onshore natural gas processing plant…", wherein, per §60.5430b, a *process controller* is defined as "…an automated instrument used for maintaining a process condition such as liquid level, pressure, delta-pressure, and temperature." There are no natural gas-driven process controllers associated with the existing Harmon Creek facility, and therefore, these standards do not apply.

(e) *Storage Vessels/Tank Batteries* – Per 40 CFR §60.5365b(e), Subpart OOOOb applies to each *storage vessel affected facility* constructed or modified on or after December 6, 2022, which includes a tank battery (i.e. one or more storage vessels manifolded together for liquid transfer) and has a potential-to-emit that either equals or exceeds 6.0 TPY VOC or 20.0 TPY methane as described in §60.5365b(e)(1)(i) or (ii). Tank batteries with potential emissions below those thresholds are not subject to this subpart provided the owner/operator maintains records of potential emissions for the life of the storage vessel. The closed drain tank underwent a throughput increase with the Harmon Creek 2 project, however, since the tank battery potential-to-emit (post control) remained below 6.0 TPY VOC and 20 TPY methane, it is not considered an affected facility under this Subpart.

(f) *The group of all equipment within a process unit* – Per 40 CFR §60.5365b(f), the group of all equipment within a process unit is considered an affected facility. Harmon Creek includes equipment to extract natural gas liquids from field gas (separators and fractionation equipment), and therefore, the site is considered a gas processing plant subject to the requirements of this Subpart.

MarkWest must comply with the requirements of §60.5400b or §60.5401b to reduce methane and VOC emissions from equipment leaks for all process unit equipment affected facilities at Harmon Creek. Per §60.5400b(b), MarkWest must monitor for leaks by implementing bimonthly monitoring surveys using optical gas imaging (OGI) in accordance with 40 CFR Part 60 Appendix K. MarkWest is required to monitor and repair all fugitive emission components in accordance with 40 CFR §60.5415b(j).

MarkWest has stated in their application that the entire Harmon Creek facility will comply with the Subpart OOOOb process unit equipment standards.

(g) *Sweetening Units* – Per §60.5365b(g)(1 and 2), each *sweetening unit affected facility* that processes natural gas produced from either onshore or offshore wells and that processes natural gas followed by a sulfur recovery unit is an affected facility under Subpart OOOOb. Per §60.5430b, a *sweetening unit* is "…a process device that removes hydrogen sulfide and/or carbon dioxide from the sour natural gas stream" and *acid gas* is "…a gas stream of hydrogen sulfide (H_2S) and carbon dioxide (CO_2) that has been separated from sour natural gas by a sweetening unit." As noted in the analysis under 40 CFR Part 60 Subpart OOOOa, although Harmon Creek incorporates an amine gas treating unit to remove CO_2 from its final products, since Harmon Creek does not process sour gas, the amine unit is not a *sweetening unit* as defined in §60.5430b and therefore not a *sweetening unit affected facility* under Subpart OOOOb.

(h) *Pumps* – Each pump affected facility, which is the collection of natural gas-driven pumps at an onshore natural gas processing plant. Pumps that are not driven by natural gas are not included in the pump affected facility. There are no natural gas-driven pneumatic pumps at this facility, and therefore, there are no applicable standards that would apply.

(i) *Fugitive Emissions Components* – Subpart OOOOb applies to each *fugitive emissions components* affected facility constructed or modified at a well site, centralized production facility, or a compressor station after December 6, 2022. Since Harmon Creek is an onshore natural gas processing plant, it is a *process unit* by definition in §60.5430b. Each *process unit affected facility* is subject to the fugitive GHG and VOC standards applicable to *process unit equipment affected facilities* as specified in §60.5400b which are not subject to the requirements for each *fugitive emissions components* affected facility.

The requirements of **40 CFR Part 60 Subpart OOOOc—*Emissions Guidelines for Greenhouse Gas Emissions from Existing Crude Oil and Natural Gas Facilities*** will apply to designated facilities of which construction, modification, or reconstruction commenced on or before December 6, 2022, at Harmon Creek.[8] Per §60.5386c, Subpart OOOOc will apply at Harmon Creek to each *centrifugal compressor designated*, each *reciprocating compressor designated facility*, each *storage vessel designated facility*, each *process unit equipment designated facility*, and to each *fugitive emissions components designated facility* as these terms are defined in 40 CFR §60.5430c. The specific applicable requirements will be determined after the Department's submittal of its plan to implement the emission guidelines of Subpart OOOOc to the United States Environmental Protection Agency (EPA).

40 CFR Part 60 Subpart JJJJ—*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* applies to manufacturers, owners, and operators of stationary spark ignition internal combustion engines as specified in §60.4230 (a)(1) through (a)(6). The compressors at this facility are not subject to this subpart since they are electrically driven with electricity supplied from the grid. For the two (2) emergency generators on site, since they are diesel-fired (compression ignition), they are not subject to this Subpart.

40 CFR Part 60 Subpart IIII—*Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* applies to manufacturers, owners, and operators of stationary compression ignition internal combustion engines as specified in §60.4200 (a)(1) through (a)(4) which includes owners and operators of stationary CI ICE that commence construction after July 11, 2005, and were manufactured after April 1, 2006, for engines that are not fire pump engines.

[8] The requirements of Subpart OOOOc apply regardless of whether the "model rule" portion of Subpart OOOOc in §§60.5385c—60.5430c or the State standards established pursuant to §§60.5360c—60.5481c of Subpart OOOOc are used.

The compressors at this facility are not subject to this subpart for the same reason that 40 CFR Part 60 Subpart JJJJ does not apply since they are electrically driven. For the two (2) emergency generators on site, since they are diesel-fired (compression ignition), they are subject to this Subpart.

As noted, March 7, 2019, the Department determined that one (1) Generac SD015 15-kW emergency genset powered by a Tier 4 certified 49-HP diesel engine and one (1) Generac SD150 150-kW emergency genset powered by a Tier 3 certified 279-HP diesel engine are sources of minor significance and were exempt from plan approval requirements. The applicable requirements for the emergency generator engines are shown in Table V below.

Table V:
Applicable Provisions of 40 CFR Part 60 Subpart IIII for the 49-HP Generac A2400T-Gen 1 (Admin Room) and the 279-HP Generac 4BT3.3-G5 Diesel-Fired Emergency Generator Engines (Source 102)

Section	Provision	Applies?
Am I subject to this subpart?	§60.4200	Yes; §60.4200(a)(2)(i)
What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?	§60.4201	Not applicable – Applies to manufacturers
What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?	§60.4202	Not applicable – Applies to manufacturers
How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?	§60.4203	Not applicable – Applies to manufacturers
What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?	§60.4204	Not applicable. – Applies to non-emergency engines
What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?	§60.4205	Yes; §4205(b) only – Meet emission standards of §60.4202
How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?	§60.4206	Yes; Achieve emission standards over lifetime of the engine
What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?	§60.4207	Yes; §60.4207(b) only- Use diesel fuel that meets the requirements of 40 CFR §1090.305 for nonroad diesel fuel
What is the deadline for importing or installing stationary CI ICE produced in previous model years?	§60.4208	Not applicable – Deadline for importing previous model year engines
What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?	§60.4209	Yes; §60.4209(a) only to install a non-resettable hour meter
What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?	§60.4210	Not applicable – Applies to manufacturers
What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?	§60.4211	Yes; §60.4211(a),(f)
What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?	§60.4212	Not applicable – No applicable performance testing requirements for emergency engines
What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?	§60.4213	Not applicable – No applicable performance testing requirements for emergency engines and engine has displacement < 30 liters

What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?	§60.4214	Yes; §60.4214(b) only – No initial notification needed; if the emergency engine does not meet the standards applicable to non-emergency engines, record hours operated during emergency and non-emergency periods
What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?	§60.4215	Not applicable. Engines not located in those geographical areas
What requirements must I meet for engines used in Alaska?	§60.4216	Not applicable. Engines not located in that geographical area
What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?	§60.4217	Not applicable – Special fuels are not used
What General Provisions and confidential information provisions apply to me?	§60.4218	Yes; General provisions of Table 8
What definitions apply to this subpart?	§60.4219	Yes; As used in this subpart, all terms not defined herein shall have the meaning given them in the CAA and in subpart A of this part.

[a] Although 60.4202 applies, it is only applicable to manufacturers (regarding certification by the manufacturers) and will therefore not be included in the operating permit.
[b] Although the importing requirements of 60.4208 apply, they are not applicable to the permittee in this context and will therefore not be included in the operating permit.

National Emissions Standards for Hazardous Air Pollutants (NESHAPs):

Title 25, Chapter 124 of the Pennsylvania Code adopts the National Emission Standards for Hazardous Air Pollutants (NESHAPs) of 40 CFR Part 61. NESHAPs are found in both 40 CFR Part 61 and 40 CFR Part 63 and are stationary source standards established by EPA for hazardous air pollutants (HAPs) which are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The Part 61 NESHAPs regulate only seven (7) hazardous air pollutants, including asbestos, beryllium, mercury, vinyl chloride, benzene, arsenic, and radon/radionuclides. None of the Part 61 standards apply to the air contamination sources at Harmon Creek.

The 1990 Clean Air Act Amendments significantly expanded EPA's authority to regulate hazardous air pollutants. Section 112 of the Clean Air Act lists 187 hazardous air pollutants to be regulated by source category. The NESHAPs promulgated after the 1990 Clean Air Act Amendments are found in 40 CFR Part 63. These standards require application of technology-based emissions standards, referred to as Maximum Achievable Control Technology (MACT), or MACT standards. Most NESHAPs are delegated to the States but both EPA and the States implement and enforce these standards. With respect to the air contamination sources at Harmon Creek, there are a few potentially applicable NESHAPs:

- 40 CFR Part 63 Subpart HH— *National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities*
- 40 CFR Part 63 Subpart JJJJJJ—*National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources*
- 40 CFR Part 63 Subpart ZZZZ—*National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

National Emission Standards for Hazardous Air Pollutants (NESHAPS) from 40 CFR Part 63 Subpart HH - Oil and Natural Gas Production Facilities applies to major and area sources of HAPs and in which the facility processes, upgrades, or stores hydrocarbon liquids or processes, upgrades, or stores natural gas prior to the point at which natural gas enters the natural gas transmission and storage source category or is delivered to a final end user. Per 40 CFR §63.760(b)(2), for area sources, this subpart only applies to the owners and operators of triethylene glycol (TEG) dehydration units. There are no existing TEG dehydration units at the facility, and therefore, this subpart does not apply.

National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources from 40 CFR Part 63 Subpart JJJJJJ applies to certain boilers. The regenerative heaters at this facility do not meet the definition of a boiler per §63.11237 of this subpart and are therefore not subject to any requirements therein.

National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines from 40 CFR Part 63 Subpart ZZZZ – This subpart was first promulgated on June 15, 2004, and had portions updated as recently as August 30, 2024. Per 40 CFR §63.6585, a person is subject to this subpart if they own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. This facility is an area source of HAP emissions and does not include stationary RICE test cells/stands. The two (2) emergency diesel-fired generator engines are subject to 40 CFR Part 63 Subpart ZZZZ. However, according to 40 CFR §63.6590(a)(2)(iii) of Subpart ZZZZ, these engines are classified as new stationary RICE since they were constructed on or after June 12, 2006.

From 40 CFR §63.6590(c), an affected source is subject to the requirements of 40 CFR Part 60 Subpart IIII which supersedes the requirements of Subpart ZZZZ if the affected source meets any of the criteria of (c) (1) - (7) of that section. The engines meet criteria (1) as new stationary RICE located at an area source and are therefore not subject to any further requirements under 40 CFR Part 63 Subpart ZZZZ. The requirements of Subpart IIII will apply, and therefore, the applicable requirements of Subpart ZZZZ will be demonstrated through compliance with Subpart IIII.

Additional Proposed Requirements for the Open Air-Assisted Flare:

The open air-assisted plant flare (C602) is required to meet the applicable requirements of 40 CFR §60.18. To ensure that the flare is operated as designed, the pilot light has an auto-reignition capability and is monitored from the control room, the flow to the flare from both the sweep gas and from the process are metered, and the blower has variable speed to adjust with the metered gas flow to ensure sufficient oxygen for combustion and to maintain the net heating value of the gas (Btu/scf). The pilots and thermocouples are monitored electronically. In addition, MarkWest conducts daily AVO inspections and monthly Method 9 inspections by certified personnel. The permittee must maintain records of and report any instance in which visible emissions are observed contrary to 40 CFR §60.18(c)(1). This facility uses a calorimeter to measure the heat content of the gas at the inlet to the flare.

Per 40 CFR §60.18, flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours… Compliance with the requirements of §60.18 are dictated by meeting applicable requirements of other Federal subparts, which in this case, would be 40 CFR Part 60 Subpart OOOOb, since having any OOOOb-affected subfacility controlled by the flare requires that continuous compliance is demonstrated by meeting the control device requirements of OOOOb.

The Department has added the following requirements to the operating permit to track the volumetric flow rate under paragraph (a) below and/or the net heat content or compositional monitoring under paragraph (b) below in accordance with 25 Pa. Code §127.441:

> The owner or operator shall operate each flare with a pilot flame present on an individual burner or stage of burners at all times when a process is routed to the flare. Each 15-minute block during which there is at least one minute where no pilot flame on an individual burner or stage of burners is present when a process is routed to the flare is a deviation of the standard. Deviations in different 15-minute blocks from the same event are considered separate deviations. The owner or operator shall monitor for the presence of a pilot flame on an individual burner or stage of burners using a device

(including, but not limited to, a thermocouple, ultraviolet beam sensor, or infrared sensor) capable of detecting that the pilot flame(s) is present.

(a) The owner or operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate in the flare header or headers that feed the flare as well as any flare supplemental gas used. Different flow monitoring methods may be used to measure different gaseous streams that make up the flare vent gas provided that the flow rates of all gas streams that contribute to the flare vent gas are determined. If assist air or assist steam is used, the owner or operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of assist air and/or assist steam used with the flare. If pre-mix assist air and perimeter assist are both used, the owner or operator shall install, operate, calibrate, and maintain a monitoring system capable of separately measuring, calculating, and recording the volumetric flow rate of premix assist air and perimeter assist air used with the flare. Flow monitoring system requirements and acceptable alternatives are provided in paragraphs (1) through (6) of this section.

(1) The flow rate monitoring systems must be able to correct for the temperature and pressure of the system and output parameters in standard conditions (i.e., a temperature of 20°C (68°F) and a pressure of 1 atmosphere).

(2) Mass flow monitors may be used for determining volumetric flow rate of flare vent gas provided the molecular weight of the flare vent gas is determined using compositional analysis so that the mass flow rate can be converted to volumetric flow at standard conditions using the following equation.

Qvol = [(Qmass)(385.3)]/MWt

Where:
Qvol = Volumetric flow rate, standard cubic feet per second.
Qmass = Mass flow rate, pounds per second.
385.3 = Conversion factor, standard cubic feet per pound-mole.
MWt = Molecular weight of the gas at the flow monitoring location, pounds per pound-mole.

(3) Mass flow monitors may be used for determining volumetric flow rate of assist air or assist steam. Use equation in paragraph (2) of this section to convert mass flow rates to volumetric flow rates. Use a molecular weight of 18 pounds per pound-mole for assist steam and use a molecular weight of 29 pounds per pound-mole for assist air.

(4) Continuous pressure/temperature monitoring system(s) and appropriate engineering calculations may be used in lieu of a continuous volumetric flow monitoring systems provided the molecular weight of the gas is known. For assist steam, use a molecular weight of 18 pounds per pound-mole. For assist air, use a molecular weight of 29 pounds per pound-mole. For flare vent gas, molecular weight must be determined using compositional analysis as specified in paragraph (b) of this section.

(5) Continuously monitoring fan speed or power and using fan curves is an acceptable method for continuously monitoring assist air flow rates.

(6) For perimeter assist air intentionally entrained in lower and/or upper steam, the monitored steam flow rate and the maximum design air-to-steam volumetric flow ratio of the entrainment system may be used to determine the assist air flow rate.

(b) The owner or operator shall determine the concentration of individual components in the flare vent gas using either the methods provided in paragraph (b)(1) **or** (2) of this section. **Alternatively, the owner or operator may elect to directly monitor the net heating value of the flare vent gas following the methods provided in paragraphs (b)(3)** of this section and, if desired, may directly measure the hydrogen concentration in the flare vent gas following the methods provided in paragraphs (b)(4) of this section. **The owner or operator may elect to use different monitoring methods for different gaseous streams that make up the flare vent gas using different methods provided the composition or net heating value of all gas streams that contribute to the flare vent gas are determined.**

(1) Except as provided in paragraphs (b)(5) and (6) of this section, the owner or operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring (i.e., at least once every 15-minutes), calculating, and recording the individual component concentrations present in the flare vent gas.

(2) Except as provided in paragraphs (b)(5) and (6) of this section, the owner or operator shall install, operate, and maintain a grab sampling system capable of collecting an evacuated canister sample for subsequent compositional analysis at least once every eight hours while there is flow of a process to the flare. Subsequent compositional analysis of the samples must be

performed according to Method 18 of 40 CFR part 60, appendix A-6, ASTM D6420-99 (Reapproved 2010), ASTM D1945-03 (Reapproved 2010), ASTM D1945-14 or ASTM UOP539-12 (all incorporated by reference—see § 63.14).

(3) Except as provided in paragraphs (b)(5) and (6) of this section, the owner or operator shall install, operate, calibrate, and maintain a calorimeter capable of continuously measuring, calculating, and recording NHVvg at standard conditions.

(4) If the owner or operator uses a continuous net heating value monitor according to paragraph (b)(3) of this section, the owner or operator may, at their discretion, install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the hydrogen concentration in the flare vent gas.

(5) Direct compositional or net heating value monitoring is not required for purchased ("pipeline quality") natural gas streams. The net heating value of purchased natural gas streams may be determined using annual or more frequent grab sampling at any one representative location. Alternatively, the net heating value of any purchased natural gas stream can be assumed to be 920 Btu/scf.

(6) Direct compositional or net heating value monitoring is not required for gas streams that have been demonstrated to have consistent composition (or a fixed minimum net heating value).

For practical enforceability of 40 CFR §60.18, the Department deems it appropriate to incorporate the monitoring requirements above under 25 Pa. Code §127.441 as well as flare operating requirements under 40 CFR §60.5415b, as applicable. Provided that the permittee has conducted any of the following, the permittee can demonstrate compliance with the requirements of 40 CFR §60.18: installing a calorimeter, tracking the gas composition at the inlet to the flare, installing a continuous pressure and temperature monitoring system, calculating the volumetric flow rate, or demonstrate that the gas stream has a fixed minimum net heating value of at least 300 Btu/scf per §60.18 at the flare inlet and a minimum combustion zone net heating value of 270 Btu/scf per 40 CFR §60.5415b(f)(vii)(B)(3) of Subpart OOOOb. MarkWest has noted that the facility monitors for the presence of a flame and uses a calorimeter to determine the net heat content of the inlet gas to the flare to demonstrate compliance with these requirements.

Emissions and Controls:

Sources 031, 033-037: Regenerator Heaters and HMO Heaters

For Sources 031 and 033-037, the three (3) regenerator heaters and three (3) HMO heaters, potential emissions at 8,760 hours of operation per year were based on manufacturer's guarantees for NOx, CO, and VOCs in lbs/MMBtu. For the remaining criteria pollutants and HAPs, potential emissions were calculated using emission factors from AP-42, Section 1.4, Tables 1.4-1, 1.4-2, and 1.4-3 (07/1998) for natural gas combustion, corrected to a site-specific gas heat content of 1,153 Btu/scf. Potential emissions for greenhouse gases were based on emission factors from 40 CFR Part 98, Subpart C and corrected to the site-specific gas heat content of 1,153 Btu/scf.

- Source 031, the Cryo Plant 1 heater has a fuel consumption rate of 0.0103 MMscfh.
- Sources 033 and 034, the two (2) 48.15 MMBtu/hr deEthanizer HMO heaters, have a maximum fuel consumption rate of 0.0418 MMscfh each.
- Source 035, a 6.60 MMBtu/hr deethanization regen heater, (H-1775) has a maximum fuel consumption rate of 0.00572 MMscfh.
- Source 036, an 11.99 MMBtu/hr Tulsa heater (H-1769), has a maximum fuel consumption rate of 0.0104 MMscfh.
- Source 037, the Cryo Plant 2 regen heater equipped with flue gas recirculation (FGR) (H-2711) has a maximum fuel consumption rate of 0.0155 MMscfh.

Source 101: Seven (7) Electric-Driven Compressors (Residue) & Source 103: Three (3) Electric-Driven Compressors (Stabilization and CO_2)

Source 101 consists of seven (7) electrically driven residue compressors first authorized under GP5-63-01011A. Emissions may occur from rod packing venting. Potential emissions were based on monitoring data from MarkWest that included a 215 scfh leak rate and the mass percentages of constituent pollutants from the monitoring data.

Similarly, Source 103 consists of three (3) electrically driven compressors, two (2) of which are stabilization compressors, and one (1) of which is a CO_2 compressor, which were first authorized under PA-63-01011. Emission estimates for these compressors were also based on monitoring data from MarkWest.

Source 102: Emergency Generators

Source 102 comprises of two (2) diesel-fired emergency generators. One (1) is a 49-HP Generac A2400T-Gen1 4-stroke reciprocating internal combustion engine with a Generac SD015 genset that was installed in 2019. The maximum fuel consumption of this engine at 100% load is 2.7 gal/hr, and it has a heat input capacity of 0.38 MMBtu/hr. This emergency generator engine is used for backup power in the administration room on site and is certified to meet EPA Tier 4 emission standards.

The other engine is a 279-HP Generac 4BT3.3-G5 4-stroke reciprocating internal combustion engine with a Generac SD150 genset that was also installed in 2019 and provides backup power to the control room on site. The emergency generator engine is certified to meet EPA Tier 3 emission standards. The maximum fuel consumption of this engine at 100% load is 13.5 gal/hr and has a heat input capacity of 1.85 MMBtu/hr.

Potential emissions from both engines were calculated in the same manner, using 500 hours of operation per year, HAP emission factors from AP-42, Section 3.2, Table 3.3-2, a SOx emission factor from AP-42, Table 3.3-1, and greenhouse gas emission factors from Part 98, Tables C-1 and C-2 for distillate fuel. Other criteria pollutant emission factors were based on manufacturer data for NOx, CO, PM, and VOCs, whereby the NOx + NMHC factor was assumed to be 76% NOx and 24% VOC for both engines.

Source 104: Centrifugal Compressor Dry Seal Vents (Partial Control by Flare)

Source 104, centrifugal compressor dry seal vents, comprises of two (2) residue centrifugal compressors and two (2) regen centrifugal compressors. The two (2) regen centrifugal compressors are controlled by the plant flare, though the residue centrifugal compressors are not. Potential emissions from the centrifugal dry seal vents were based on the maximum allowable emission rate of 600 scfh under 40 CFR Part 60 Subpart OOOOb and gas density and the mass percentage of constituent components in the gas from monitoring data. Per Subpart OOOOb, the volumetric flow rate per seal must not exceed 10 scfm per seal.

Source 301: Tanks/Vessels (Controlled by Flare)

Source 301 comprises of one (1) 4,200-gallon closed drain tank and one (1) 1,430-gallon closed drain amine tank. For purposes of 40 CFR Part 60 Subpart OOOOa, the two (2) tanks are considered a *tank battery*, or one or more storage vessels manifolded together for liquid transfer. Potential emissions of the 4,200 gallon closed drain tank used a throughput volume of 220,000 gal/yr, which is approximately three times higher than historical actual throughput. The tank volume was based on engineering calculations of 550 acf. Emission rates were calculated using the equations under AP-42, Chapter 7, Section 7.1.3.1.1 for standing losses for a fixed roof tank, which is the loss of stock vapors as a result of tank vapor space breathing as well as Section 7.1.3.1.2 for working losses, which are the loss of stock vapors as a result of tank filling

operations. An emission rate of 11.81 MMscf/yr was calculated, and a gas density of 0.056 lbs/scf was used. Tank losses assumed the same composition as the inlet to the facility. Emissions from the closed drain tank are sent to the plant flare and are guaranteed to have a minimum 98% destruction efficiency from the flare manufacturer.

Potential emissions of the 1,430-gallon amine tank were calculated using the same equations from AP-42 as the closed drain tank. The annual throughput of the tank was estimated at two times historical actual values plus an additional 20% factor for a total of 10,080 gal/yr, rather than three times the historical average as was the case with the closed drain tank. The amine tank loss emissions assume the composition with the highest hydrocarbon content anticipated to be routed to the amine closed drain tank. An emission rate of 0.82 MMscf/yr was used, as well as a gas density of 0.193 lbs/scf. Since the two storage tanks/vessels are considered a tank battery, emissions from the amine tank are also sent to the plant flare and are guaranteed to have a minimum 98% destruction efficiency from the flare manufacturer.

Source 302: Two (2) 500-Gallon Methanol Tanks

Source 302 consists of two (2) 500-gallon methanol tanks and are estimated to have a combined usage of no more than 100 gallons of methanol per year between the two tanks. According to the applicant actual methanol usage is closer to five (5) gallons per year per tank. Emissions from the methanol tanks were modeled using Bryan Research & Engineering, LLC ProMax 5.0® software and assumed that all methanol injected into the system was emitted into the atmosphere.

Source 601: Venting/Blowdowns (Controlled by Flare):

Blowdowns occur when a piece of equipment such as an engine, compressor, or filter need to be emptied to allow for maintenance in a safe manner and typically vent to the atmosphere. Blowdowns are able to isolate specific pieces of equipment, such as a single compressor engine, whereas an emergency shutdown (ESD) is the evacuation of process gas from all or most of the air contamination sources and air cleaning devices at a facility. At this facility, blowdowns and emergency shutdowns are typically routed to the flare for a 98% control of VOC, HAP, and methane emissions when feasible. Emissions from blowdowns and ESDs are based on the estimated volumetric flowrate of equipment on site, including regen centrifugal compressors, the electrically-driven reciprocating compressors, deEthanizer screws, miscellaneous maintenance activities, and one plant-wide shutdown per year. Potential emissions were also based on the number of estimated blowdown events per year, expected duration, volume of gas routed to the flare, and the weight percentage of VOCs, HAPs, methane, and CO_2 in the inlet gas stream to the flare.

One emergency shutdown is included in the potential-to-emit calculations since MarkWest is required to conduct an annual test of the emergency shutdown system and is therefore a predictable event. All emissions related to unplanned ESDs, should any occur, are required to be reported both as a malfunction and in annual AES emission inventory reports. Additionally, all malfunctions are evaluated for potential enforcement action. Emissions from blowdowns and ESDs are included in the potential emission estimates from the flare. Table VI below shows the historical reporting of VOC and HAP emissions from Source 601.

Table VI:
Historical Reporting of Emissions from Source 601[a,b]

Source 601	Venting/Blowdowns				Potential-to-Emit (TPY)[c]			
Year	Reported VOCs	Reported HAPs	Methane	CO_2	VOC	HAP	Methane	CO_2
2024	0.02260	0.00030	0.3340	0.00120	2.13	0.04	6.84	0.02
2023	0.0002	0.00000	0.0160	0.00010				
2022	4.3166	0.00000	11.2529	0.03740				
2021	0.0001	0.00000	0.0042	0.00000				
2020	0.0736	0.00000	0.2305	0.00080				

[a] All units are in tons per year (TPY), as reported in annual AES emission reports.
[b] Actual emissions may be higher than the potential due to unplanned emergency shutdowns.
[c] Based on the potential-to-emit as shown in the initial state-only operating permit application received on January 3, 2025, that is subject of this review.

Source 701: Fugitives

Source 701 represents fugitive emissions from various components on site, such as valves, flanges, pumps, connectors, and other similar equipment on site. There are an estimated 21,343 fugitive emission components at this facility. The facility is required to conduct a leak detection and repair (LDAR) program on a quarterly basis. In addition, because this facility was built to the TCEQ 28VHP standards, for purposes of potential-to-emit, MarkWest has claimed the LDAR reduction percentages found under APDG 6422v2 (revised July 2022). The 28VHP Program includes boilerplate conditions that an operator must follow in order to claim the 28VHP reduction factors. MarkWest is meeting those requirements.

Fugitive emission calculations were based on the representative fractional gas analysis sampled on August 1, 2023, and emission factors from Table 2-4 of the EPA's November 1995 guidance document *Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates* (EPA 453/R-95-017). The EPA document uses emission factors based on the average measured total organic compounds (TOC) from component types indicated in gas or light oil service at oil and gas production operations. Total organic compounds include VOCs and any organic compound that the EPA has designated as having negligible photochemical reactivity, and as such, TOC can be used as a conservative estimate for VOCs. Fugitive emission estimates that were provided to the Department by MarkWest used a 23.89% VOC content and a 0.4088% HAP content by weight. Since there are a large number of fugitive components at this facility, using emission factors based on the *average* measured TOC is acceptable. This guidance document is also widely used by the oil and gas industry and accepted by regulatory authorities throughout the country.

Source 702: Truck Loadout

Potential emissions from truck loadout used emission factors from AP-42, Table 5.2-1 for tank trucks in submerged loading (dedicated normal service), a Reid vapor pressure using gasoline as a proxy from AP-42, Table 7.1-2, an actual vapor pressure of 8.1621 psia, a daily average liquid surface temperature using EPA TANKS 4.09d software, and loading losses using equations from AP-42, Section 5.2. Loading losses are routed to and controlled by the flare.

Source 703: Measurement Devices

There are eight (8) spectra analyzers and twenty-one (21) gas chromatograph (GC) devices at this facility. A measurement team sets the flow rate, which, in this case, was set to not exceed 2.12 scf/hr for the spectra analyzer and 0.04 scf/hr for the gas chromatography analyzers. Samples are continuously and automatically measured from the gas stream. The potential-to-emit for these analyzers were based on the flow rate set

point, 8,760 hours of operation per year, the gas density from the gas analysis, and the weight percent of each pollutant from the inlet gas analysis.

Source 801: Pigging Operations (Controlled by Flare or VRU)

A pig launcher or receiver is a short segment of pipe that can be separated by valves from the remainder of the pipeline. The segment of pipe is used to either load or unload a pig, which is a device used to clear the pipeline of residual liquids. Pigging activities may result in fugitive emissions when the final pounds of pressure in a pig barrel are released to allow for the door of the pig trap to be opened safely. The facility has four (4) high pressure pig launchers and one (1) high pressure pig receiver as follows:

- Houston Plant HP NGL Launcher
- Mariner West HP Ethane Launcher
- National Fuel Line N HP Residue Launcher
- Rover HP Interconnect Launcher
- Smith CS to Harmon Creek Plant HP Receiver

The launchers and receiver do not utilize high to low pressure jumpers but are controlled by the flare. Emissions from pigging operations are based on barrel sizes, a conservative estimate of the molecular weight of the gas composition, the weight percentage of each total organic compound (TOC) (as a surrogate for VOCs) and HAPs based on a representative gas analysis, and the Real Gas Law. The estimated total volume of natural gas emitted from pigging operations, based on 345 events per year, was calculated to be 760,236 scf/yr, equating to 0.102 TPY VOC and 0.008 TPY HAP.

MarkWest did include a multiplicative factor of 1.2 for the mass of VOC emissions, which was originally required in the aforementioned 2018 Consent Decree, however, since that consent decree has been terminated, MarkWest is no longer required to use a multiplicative factor when calculating potential emissions from pigging operations. For purposes of this review, the calculation will remain since it is a more conservative estimate.

MarkWest is required to record the number of pigging events occurring and the volume of liquids cleared, among other recordkeeping requirements, and must include emissions from pigging operations in their annual AES emission reports.

Source C601: Air-Assisted Open Plant Flare

Source C601 is an air-assisted open flare. This flare has a capacity of 100 MMscf/yr plus an additional 26.518 MMscf/yr from the flare pilot and purge gas. The flare controls the following air contamination sources:

- Source 101, seven (7) 5,000-HP electric driven compressor rod packing emissions;
- Source 103, three (3) 5,000-HP electric driven compressor rod packing emissions;
- Source 104, centrifugal dry seal vents;
- Source 301, Tanks/Vessels, which includes one (1) 4,200-gallon closed drain tank and one (1) 1,430-gallon amine tank;
- Source 601, Venting/Blowdowns;
- Source 702, Truck Loadout; and
- Source 801, Pigging Operations.

The pilot and purge gas have a heat input rating of 3.205 MMBtu/hr, and calculations used 1,059 Btu/scf for the higher heating value of the fuel for the pilot and purge gas. The NOx and CO emission factors are from AP-42 Section 13.5 "Industrial Flares" Table 13.5-1 (0.068 lbs NOx/MMBtu and 0.31 lbs CO/MMBtu, respectively). The emission factors for SOx and variants of particulate matter were from AP-42, Section 1.4, Tables 1.4-1 and 1.4-2 for natural gas combustion. Emission factors for greenhouse gases were from 40 CFR Part 98, Subpart C, Tables C-1 and C-2. Emissions of VOCs and HAPs were based on mass balance calculations.

For the inlet gas to the flare for combustion, calculations used a higher heating value of 1,282.67 Btu/scf and a mass loading rate of 650 lbs/hr. The flare calculations assume the composition to the flare is inlet gas. Routine blowdowns are routed to the existing flare and tracked by the flow meter on the flare but may not encompass emergency shutdowns, though emergency shutdowns are typically routed to the flare. The flare is rated at 8,134 MMBtu/hr and has an annual capacity of 126.52 MMscf/yr (100 MMscf/yr from hydrocarbon combustion and 26.52 MMscf/yr from the pilot and purge gas). The annual flare capacity includes emissions from pigging, truck loadout, dry seal vents (partial), storage tanks, most process safety valves, pressure relief valves, and planned maintenance blowdowns.

Plan approval 63-01011A included a requirement to conduct quarterly gas analyses, which will be included as a requirement in the proposed state-only operating permit. A representative gas analysis used for potential-to-emit emission calculations is shown in Table VII below. The inlet gas composition is based on a sample collected on August 1, 2023, from the inlet to the plant and a 30% factor was applied by the permittee for conservatism. The residue gas and C_2+ gas compositions are the annual average from gas chromatograph readings. Stabilizer overhead and CO_2 compositions are modeled.

Table VIII shows a summary of actual emissions from the facility over the past five years.[9] Table IX shows the potential-to-emit of this facility (and excludes any air contamination sources authorized under plan approval PA-63-01011B which is currently undergoing construction).

[9] The annual AES emission report for calendar year 2025 is due by March 1st for all facilities unless an extension is granted by the Department. Data for the reporting year 2025 has been received but has not yet been reviewed by the Department as of the date of writing.

Table VII:
Gas Analysis[b]

Component	MW	Unit	Inlet Gas	Residue Gas-Recovery	Residue Gas[b]	Stabilizer Overhead[a]	CO_2[a]	C_2+[b]
Nitrogen	28.0135	mole %	0.410	0.51	0.48	0.10	0.00	0.00
CO_2	44.0100	mole %	0.100	0.20	0.12	0.16	96.84	0.06
H_2S	34.1000	mole %	0.000	0.00	0.00	0.00	0.00	0.00
Methane	16.0420	mole %	77.010	97.41	92.99	44.04	0.03	0.10
Ethane	30.0690	mole %	14.790	1.84	6.35	29.62	3.12	59.23
Propane	44.0960	mole %	5.150	0.04	0.06	17.14	0.02	23.38
i-Butane	58.1220	mole %	0.540	0.00	0.00	1.86	0.00	2.95
n-Butane	58.1220	mole %	1.260	0.00	0.00	4.96	0.00	7.05
i-Pentane	72.1490	mole %	0.250	0.00	0.00	0.79	0.00	1.69
n-Pentane	72.1490	mole %	0.290	0.00	0.00	1.06	0.00	2.18
n-Hexane	86.1750	mole %	0.050	0.00	0.00	0.20	0.00	3.46
n-Heptane	100.2020	mole %	0.040	0.00	0.00	0.05	0.00	0.00
n-Octane	114.2290	mole %	0.000	0.00	0.00	0.00	0.00	0.00
Benzene	78.1220	mole %	0.008	0.00	0.00	0.00	0.00	0.00
Toluene	92.1380	mole %	0.012	0.00	0.00	0.00	0.00	0.00
Ethylbenzene	106.1670	mole %	0.001	0.00	0.00	0.00	0.00	0.00
Xylene	106.160	mole %	0.002	0.00	0.00	0.00	0.00	0.00
Nonanes	128.2550	mole %	0.002	0.00	0.00	0.00	0.00	0.00
Decanes Plus	142.2820	mole %	0.021	0.00	0.00	0.00	0.00	0.00
Component	*MW*	*Unit*	*Inlet Gas*	*Residue Gas - Recovery*	*Residue Gas*	*Stabilizer Overhead*	*CO_2*	*C_2+*
Nitrogen	28.0135	wt%	0.5530	0.8738	0.7852	0.0965	0.0000	0.0000
CO_2	44.01	wt%	0.2119	0.5278	0.3121	0.2440	97.8220	0.1187
H_2S	34.1	wt%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methane	16.042	wt%	77.0100	95.1232	87.5426	24.2604	0.0092	0.0736
Ethane	30.069	wt%	21.4104	3.3662	11.2128	30.5465	2.1522	48.5233
Propane	44.096	wt%	10.9331	0.1031	0.1442	25.9200	0.0166	27.2355
i-Butane	58.122	wt%	1.5110	0.0025	0.0011	3.7135	0.0000	3.8104
n-Butane	58.122	wt%	3.5257	0.0035	0.0013	9.8881	0.0000	9.4580
i-Pentane	72.149	wt%	0.8684	0.0000	0.0002	1.9617	0.0000	2.4280
n-Pentane	72.149	wt%	1.0073	0.0000	0.0005	2.6260	0.0000	3.1565
n-Hexane	86.175	wt%	0.1908	0.0000	0.0001	0.5960	0.0000	5.3212
n-Heptane	100.202	wt%	0.2026	0.0000	0.0000	0.1622	0.0000	0.0000
n-Octane	114.229	wt%	0.0110	0.0000	0.0000	0.0192	0.0000	0.0000
Benzene	78.122	wt%	0.0301	0.0000	0.0000	0.0000	0.0000	0.0000
Toluene	92.138	wt%	0.0532	0.0000	0.0000	0.0000	0.0000	0.0000
Ethylbenzene	106.167	wt%	0.0301	0.0000	0.0000	0.0000	0.0000	0.0000
Xylene	106.16	wt%	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000
Nonanes	128.255	wt%	0.0123	0.0000	0.0000	0.0000	0.0000	0.0000
Decanes Plus	142.282	wt%	0.1438	0.0000	0.0000	0.0000	0.0000	0.0000

Total VOC wt % = 23.89% **Total HAP wt%= 0.4088%** **Density = 0.0558 lbs/ft^3**

[a] Stabilizer Overhead and CO_2 compositions are modeled.

[b] The inlet gas composition is based on a sample collected on 8/1/2023 from the Harmon Creek plant feed inlet and a 30% factor is applied for conservatism. The residue gas and C_2+ gas compositions are the annual average from gas chromatograph readings.

Table VIII:
Actual Emissions as Reported

Pollutant	2020	2021	2022	2023	2024
2,2,4-Trimethylpentane	*Not reported*	0.00	0.00	0.00	0.00
Barium	0.00	0.00	0.00	0.00	0.00
Benzene	0.00	0.00	0.08	0.00	0.00
Butane	0.54	0.54	0.59	0.59	0.74
Cadmium	0.00	0.00	0.00	0.00	0.00
Carbon Dioxide	32,264.40	32,816.33	28,937.67	36,218.13	46,226.63
Carbon Monoxide	14.49	11.23	12.27	17.32	29.52
Chromium	0.00	0.00	0.00	0.00	0.00
Copper	0.00	0.00	0.00	0.00	0.00
Ethane	0.80	0.80	0.88	0.86	1.09
Ethyl Benzene	0.00	0.00	0.00	0.00	0.00
Formaldehyde	0.02	0.02	0.03	0.06	0.12
Hexane	0.61	0.78	0.76	2.04	2.93
Manganese	*Not reported*	*Not reported*	0.00	0.00	0.00
Mercury	*Not reported*	*Not reported*	0.00	0.00	0.00
Methane	13.27	22.70	144.21	144.92	98.34
Methanol	*Not reported*	0.18	0.36	0.46	0.36
Molybdenum	0.00	0.00	0.00	0.00	0.00
Naphthalene	0.00	0.00	0.00	0.00	0.00
Nickel	0.00	0.00	0.00	0.00	0.00
Nitrogen Oxides	12.21	3.10	3.67	11.84	20.55
Nitrous Oxide (N_2O)	0.06	0.06	0.06	0.07	0.09
Particulate Matter < 10 Microns	0.61	0.56	0.57	0.56	0.99
Particulate Matter < 2.5 Microns	0.61	0.56	0.57	0.56	0.99
Particulate Matter, Condensable	1.84	1.69	1.76	1.69	2.95
Pentane	0.67	0.66	0.73	0.72	0.90
Propane	0.41	0.41	0.46	0.44	0.57
Sulfur Oxides	0.19	0.20	0.20	0.16	0.28
Toluene	0.00	0.00	0.04	0.00	0.00
Vanadium	0.00	0.00	0.00	0.00	0.00
Volatile Organic Compounds	3.57	5.10	10.10	12.57	17.52
Xylenes (Isomers & Mixture)	0.00	0.00	0.02	0.00	0.00
Zinc	0.00	0.00	0.00	0.00	0.00

Table IX:
Potential-to-Emit by Source[a]

Source ID	Description		Capacity	NOx		CO		VOC		SOx		PM_{10} (FIL)		$PM_{2.5}$ (FIL)		PM-CON		Total PM		Formaldehyde		Hexane		Benzene		Toluene		Ethylbenzene		Xylene		Total HAP		CO_2		CH_4		N_2O		CO_2e	
---	---		---	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
031	11.84 MMBtu/hr Cryo Plant 1 Regen Heater (H-1711)		11.84 MMBtu/hr	0.473	2.074	0.473	2.074	0.225	0.985	0.0070	0.0305	0.022	0.097	0.022	0.097	0.066	0.290	0.0882	0.3863	0.000870	0.00381	0.0209	0.0915	0.0000244	0.000107	0.0000395	0.000173	---	---	---	---	0.0219	0.0960	1,564	6,850	0.02950	0.129	0.00295	0.013	1,566	6,857
033	48.15 MMBtu/hr De-Ethanizer HMO Heater 1 (H-1767)		48.15 MMBtu/hr	1.926	8.435	1.926	8.435	0.915	4.007	0.0283	0.1240	0.090	0.393	0.090	0.393	0.269	1.178	0.3587	1.5713	0.00354	0.0155	0.0850	0.372	0.0000991	0.000434	0.000160	0.000703	---	---	---	---	0.0891	0.390	6,362	27,864	0.11999	0.526	0.01200	0.053	6,369	27,865
034	48.15 MMBtu/hr De-Ethanizer HMO Heater 2 (H-1768)		48.15 MMBtu/hr	1.926	8.435	1.926	8.435	0.915	4.007	0.0283	0.1240	0.090	0.393	0.090	0.393	0.269	1.178	0.3587	1.5713	0.00354	0.0155	0.0850	0.372	0.0000991	0.000434	0.000160	0.000703	---	---	---	---	0.0891	0.390	6,362	27,864	0.11999	0.526	0.01200	0.053	6,369	27,865
035	6.60 MMBtu/hr De-Ethanizer Regen Heater (H-1775)		6.60 MMBtu/hr	0.264	1.156	0.264	1.156	0.125	0.549	0.0039	0.0170	0.012	0.054	0.012	0.054	0.037	0.162	0.0492	0.2154	0.000485	0.00213	0.0116	0.0510	0.0000136	0.0000595	0.0000220	0.0000964	---	---	---	---	0.01	0.05	872	3,820	0.01645	0.072	0.00164	0.007	873.059	3,824
036	11.99 MMBtu/hr Stabilization HMO Heater (H-1769)		11.99 MMBtu/hr	0.480	2.101	0.480	2.101	0.228	0.998	0.0071	0.0309	0.022	0.098	0.022	0.098	0.067	0.293	0.0893	0.3913	0.000882	0.00386	0.0212	0.0927	0.0000247	0.000108	0.0000400	0.000175	---	---	---	---	0.0222	0.0972	1,584	6,939	0.02988	0.131	0.00299	0.013	1,585.85	6,946
037	17.84 MMBtu/hr Cryo Plant 2 Regen Heater (H-2711) w/ FGR		17.84 MMBtu/hr	0.196	0.860	0.714	3.126	0.339	1.485	0.0105	0.0460	0.232	1.016	0.232	1.016	0.232	1.016	0.232	1.016	0.00131	0.00575	0.0315	0.138	0.0000367	0.000161	0.0000595	0.000260	---	---	---	---	0.033	0.145	2,357	10,324	0.04446	0.195	0.00445	0.019	2,359.36	10,334
101	Seven (7) Electric Driven Compressors (Residue)		5,000-HP; 215 scfh	---	---	---	---	0.096	0.421	---	---	---	---	---	---	---	---	---	---	---	---	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.891	57.037	249.822	---	---	1,597.26	6,996
102	Emergency Diesel-Fired Generators	Admin Room	15-kW Genset w/ 49-HP Diesel Engine (Tier 4)	0.26	0.07	0.14	0.04	0.08	0.02	0.10	0.03	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.000444	0.000111	---	---	0.000351	0.0000878	0.000154	0.0000385	---	---	0.000107	0.0000268	0.00143	0.000357	61.42	15.35	0.00	0.0006	0.00	0.0001	3.52	15
		Electrical Room	150-kW Genset w/ 279-HP Diesel Engine (Tier 3)	1.31	0.33	0.55	0.14	0.41	0.10	0.10	0.03	0.04	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.0022	0.0005	---	---	0.0017	0.0004	0.0008	0.0002	---	---	0.0005	0.0001	0.01	0.00	302.59	75.65	0.01	0.00	0.00	0.00	17.27	76
103	Three (3) Electric Driven Compressors with Rod Packing	Stabilization Compressors (2)	5,000-HP; 1.08 scfh CH_4 each	---	---	---	---	0.170	0.743	---	---	---	---	---	---	---	---	---	---	---	---	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.010	0.001	0.004	0.092	0.402	---	---	2.58	11
		CO_2 Compressor (1)	5,000-HP; 215 scfh	---	---	---	---	0.004	0.018	---	---	---	---	---	---	---	---	---	---	---	---	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.146	105.760	0.002	0.010	---	---	24.20	106
104	Centrifugal Compressor Dry Seal Vents	Residue Centrifugal Compressors	600 scfh	---	---	---	---	0.153	0.671	---	---	---	---	---	---	---	---	---	---	---	---	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.324	1.420	90.956	398.386	---	---	2,547.03	11,156
		Regen Centrifugal Compressors	600 scfh; 1.339 lbs/hr (98% DE)	---	---	---	---	0.320	1.401	---	---	---	---	---	---	---	---	---	---	---	---	0.003	0.011	0.000	0.002	0.001	0.003	0.000	0.002	0.000	0.001	0.005	0.024	0.003	0.012	1.031	4.516	---	---	28.77	126
202	Amine Unit		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
301	Tanks/Vessels	Closed Drain Tank	4,200-gallons	---	---	---	---	---	*(1.573)*	---	---	---	---	---	---	---	---	---	---	---	---	---	0.013	---	0.002	---	0.004	---	0.002	---	0.001	---	0.027	---	0.014	---	5.073	---	---	---	142
		Amine Tank	1,430-gallons	---	---	---	---	---	*(0.000)*	---	---	---	---	---	---	---	---	---	---	---	---	---	0.000	---	0.000	---	0.000	---	0.000	---	0.000	---	0.000	---	0.804	---	0.002	---	---	---	1
302	Two (2) 500-Gallon Methanol Tanks		500-gallons each	---	---	---	---	0.080	0.352	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.080	0.352	---	---	---	---	---	---	---	---
601	Venting/Blowdowns		---	---	---	---	---	0.487	*(2.13)*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.008	0.04	0.004	0.02	1.561	6.84	---	---	43.7	192
701	Fugitives		---	---	---	---	---	2.46	10.75	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.08	0.34	0.08	0.37	2.85	12.47	---	---	79.91	350
702	Truck Loadout		220,000 gal/yr	---	---	---	---	---	*(0.78)*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
703	Measurement Devices	8 Spectra Analyzers 21 Gas Chromatographs	2.15 scfh	---	---	---	---	0.24	1.033	---	---	---	---	---	---	---	---	---	---	---	---	0.000	0.008	0.000	0.001	0.000	0.002	0.000	0.001	0.000	0.000	0.000	0.018	0.000	0.009	0.76	3.330	---	---	21.28	93
801	Pigging		---	---	---	---	---	---	*(0.102)*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.008	---	0.001	---	0.33	---	---	2.10	10
C037	Cryo Plant 2 Regen Heater FGR		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
C601	Plant Flare		8,134 MMBtu/hr; 126.52 MMscf/yr	1.21	5.32	5.53	24.23	3.05	13.34	0.01	0.04	0.03	0.12	0.03	0.12	0.09	0.37	0.11	0.50	---	---	0.02	0.11	0.00	0.02	0.01	0.03	0.00	0.02	0.00	0.01	0.05	0.23	2090.78	9157.61	12.23	53.56	0.00	0.02	2,434.47	10,663
Misc.	Air-actuated pneumatic devices (previously 501)		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total:	---		---	**8.05**	**28.78**	**12.00**	**49.74**	**10.30**	**40.88**	**0.30**	**0.47**	**0.56**	**2.19**	**0.56**	**2.19**	**1.09**	**4.51**	**1.35**	**5.67**	**0.01**	**0.05**	**0.28**	**1.26**	**0.00**	**0.03**	**0.01**	**0.04**	**0.00**	**0.03**	**0.00**	**0.01**	**0.50**	**2.22**	**21,580**	**93,018**	**167**	**736**	**0.04**	**0.18**	**25,955**	**113,684**

[a]Values for VOC emissions that are shown in parentheses are routed to the flare and are therefore not included in the VOC total. The values in parentheses represent theoretical values if those sources were not routed to the flare. Emissions from Source 201, the amine unit, Source 301, Tanks/Vessels, Source 601, Venting/Blowdowns, Source 702, Truck Loadout, and Source 801, Pigging, are represented by the emissions from the flare under Source C601. Source 104 is partially controlled by the flare.

Conclusion:

I have completed my review of the initial state-only operating permit application for the MarkWest Liberty Midstream & Resources, L.L.C. Harmon Creek natural gas processing plant located in Smith Township, Washington County. The applicant has met the regulatory requirements associated with this application submittal. The attached permit reflects the terms and conditions as described in the permit application. I recommend that MarkWest Liberty Midstream & Resources, L.L.C. be granted authorization to operate the following air contamination sources:

- Source 031, one (1) 11.84 MMBtu/hr Cryo Plant 1 Regen Heater (H-1711);
- Source 033, one (1) 48.15 MMBtu/hr deEthanizer HMO Heater 1 (H-1767);
- Source 034, one (1) 48.15 MMBtu/hr deEthanizer HMO Heater 2 (H-1768);
- Source 035, one (1) 6.60 MMBtu/hr deEthanizer regen heater (H-1775);
- Source 036, one (1) 11.99 MMBtu/hr stabilization HMO heater (H-1769);
- Source 037, one (1) 17.84 MMBtu/hr Cryo Plant 2 regen heater (H-2711) equipped with flue gas recirculation (FGR);
- Source 101, seven (7) 5,000-HP electric-driven residue compressors with rod packing emissions;
- Source 102, two (2) diesel-fired emergency generator engines (49-HP and 279-HP);
- Source 103, three (3) 5,000-HP electric driven compressors comprising of two (2) stabilization compressors and one (1) CO_2 compressor with rod packing emissions;
- Source 104, centrifugal compressor dry seal vents comprising of two (2) uncontrolled residue centrifugal compressors and two (2) regen centrifugal compressors controlled by a 126.52 MMBtu/hr plant flare;
- Source 202, an amine unit;
- Source 301, Tanks/Vessels, comprising of one (1) 4,200-gallon closed drain tank and one (1) 1,430-gallon amine tank with emissions controlled by a 126.52 MMBtu/hr plant flare;
- Source 302, two (2) 500-gallon methanol storage tanks;
- Source 601, Venting/Blowdowns (partially controlled by the 126.52 MMBtu/hr plant flare);
- Source 701, Fugitives, with emission reductions achieved through an LDAR program;
- Source 702, Truck Loadout, with emissions controlled by the 126.52 MMBtu/hr plant flare;
- Source 703, Measurement Devices;
- Source 801, Pigging Operations, controlled by the 126.52 MMBtu/hr plant flare; and
- Miscellaneous sources including air-actuated pneumatic devices (previously designated as Source 501).

I recommend the issuance of a natural minor state-only operating permit for this facility upon completion of the public comment period. Notice of intent to issue this state-only operating permit will be published in the *Pennsylvania Bulletin*. The company, the Air Quality District Supervisor, and the Air Quality inspector will be provided with this proposed state-only operating permit.