

May 28, 2024

VIA EMAIL (AJuarez@marathonpetroleum.com)

Alexandra M. Juarez – Environmental Engineer
MarkWest Liberty Midstream & Resources, LLC
4600 J Barry Court, Suite 500
Canonsburg, PA 15317

Re: Identification of Technical Deficiencies
MarkWest Liberty Midstream & Resources, LLC – Harmon Creek Gas Plant
Application for Plan Approval PA-63-01011B
APS No. 1066962, AUTH No. 1471222
Smith Township, Washington County

Dear Alexandra M. Juarez:

After conducting an initial technical review of the above referenced application for plan approval received on January 19, 2024, which was determined to be administratively complete on January 31, 2024, the Department of Environmental Protection (“Department”) has determined that the application is technically deficient. The specific technical deficiencies are based on applicable laws and regulations, including 25 Pa. Code §127.12(a)(2, 3, 5, and 10) which specify that an application for plan approval shall:

- (2) Contain information that is requested by the Department and is necessary to perform a thorough evaluation of the air contamination aspects of the source.
- (3) Show that the source will be equipped with reasonable and adequate facilities to monitor and record the emissions of air contaminants and operating conditions which may affect the emissions of air contaminants and that the records are being and will continue to be maintained and that the records will be submitted to the Department at specified intervals or upon request.
- (5) Show that the emissions from a new source will be the minimum attainable through the use of the best available technology.
- (10) Show that the source and the air cleaning devices are capable of being and will be operated and maintained in accordance with good air pollution control practices.

Technical Deficiencies

1. Please provide specification sheets and safety data sheets (SDSs) for each product shipped offsite including but not limited to condensate, ethane, natural gas liquids (NGLs), residue gas, and Y-grade NGLs. [25 Pa. Code §127.12(a)(2)]

2. Please add the following information to the provided Process Flow Diagram (January 2024):
 - a. Identify the source and type of liquids (and the tank(s) in which they are stored) which are ultimately transferred to tanker trucks at the truck loadout.
 - b. Identify which fugitive emissions (701) are sent to flare.

[25 Pa. Code §127.12(a)(2)]

3. The application does not consistently discuss the proposed sources. For example, the BAT analysis refers to three (3) proposed reciprocating compressors and does not address centrifugal compressors, where other sections of the application refer to three (3) proposed centrifugal compressors and one (1) reciprocating compressor. Please make the necessary corrections. [25 Pa. Code §127.12(a)(2)]
4. For each technically feasible control type identified in the BAT analysis for which “availability” was determined based on economic feasibility, cost analyses using EPA OAQPS Air Pollution Control Cost Manual methodology must be provided. The cost analyses are to be based on the direct and indirect costs of the controls and ancillary control equipment not the total capital costs for the proposed project(s). For comparable control cost data, refer to the BAT and cost analysis data for enclosed flares in the “Technical Support Document For the General Plan Approval and/or General Operating Permit for Unconventional Natural Gas Well Site Operations and Remote Pigging Stations (BAQ-GPA/GP-5A, 2700-PM-BAQ0268) And the Revisions to the General Plan Approval and/or General Operating Permit for Natural Gas Compressor Stations, Processing Plants, and Transmission Stations (BAQ-GPA/GP-5, 2700-PM-BAQ0267)” (August 2018). [25 Pa. Code §127.12(a)(2)]
5. Please provide all vendor quotes, manufacturer’s specifications, supporting documentation, operational assumptions including nominal and maximum control device inflow, and calculations used to evaluate the emissions control cost(s) for the proposed new sources or modifications to existing sources. [25 Pa. Code §127.12(a)(2)]
6. Please provide manufacturer, model number, specifications, and rod packing design leak rates for reciprocating compressors, if proposed. [25 Pa. Code §127.12(a)(2)]
7. Please provide manufacturer, model number, specifications, and dry seal design leak rates for centrifugal compressors, if proposed. [25 Pa. Code §127.12(a)(2)]
8. Please identify and describe all equipment, devices, methods, and techniques that will be implemented to ensure that all proposed process safety valves are fully seated during normal operation and fully reseated after opening to prevent excess gas from being sent to the plant flare (or other control device) and thus reduce emissions of air contaminants to the maximum degree possible. Please develop and provide an inspection and maintenance program to ensure that the valves, actuators, and seals/sealing surfaces are operated and maintained in a manner consistent with good air pollution control practice for minimizing emissions. [25 Pa. Code §127.12(a)(2), §127.12(a)(4), §127.12(a)(5), and §127.12(a)(10)]

9. The BAT analysis provided for use of the existing open elevated plant flare to control emissions for new and modified sources is incomplete and also includes information that does not appear to be technically accurate.
- a. Per the Department’s *General Plan Approval and/or General Operating Permit for Natural Gas Compression and/or Processing Facilities* (“GP-5”) (2700-PM-BAQ0267; 6/2018), open flares may only be approved for control of new and modified sources at remote locations and for infrequent operations. Please provide justification as to how the existing plant flare will be operated “infrequently”.
 - b. The BAT analysis included emissions data cases for the use of the existing process flare, the existing process flare in conjunction with an enclosed combustion device (ECD) with 98% destruction and removal efficiency (DRE), and the existing process flare in conjunction with an enclosed combustion device (ECD) with 99% DRE. Please provide the same data for the use of one ECD with 99% DRE sized to handle all proposed to-be-flared streams.
 - c. Per the Department’s research, at least one manufacturer offers enclosed ground flares with a guaranteed destruction efficiency of 99.9%. (Baker Enclosed Flare System; <https://bakerfurnace.com/pollution-control-equipment/enclosed-ground-flares#specs>). Please evaluate.
 - d. Please identify the normal operating pressure range of the existing plant flare header system.
 - e. From the supplied BAT analysis: “MPLX has evaluated the feasibility of installing multiple smaller ECDs at the facility as requested by the Department. Each ECD requires a significant footprint for equipment and piping and, per API standards, must be constructed at a specific height and distance from the process. To accommodate multiple ECDs at the facility, MPLX would be required to acquire more land, create new disturbed acreage, and undergo timely permitting processes related to such projects.”
 - i. Please provide a complete PDF copy of *American Petroleum Institute (API) Standard 537 – Flare Details for Natural Gas Industries*.
 - ii. The statement that “[e]ach ECD requires a significant footprint for equipment...” appears to conflict with publicly available information. Although a vertical open flare has a much smaller physical footprint, it is the Department’s understanding that a vertical flare requires a safety radius of 9.3 times that required for an equivalently sized ECD. Please address. (See “A Comparative Assessment of Open Flame Flares and Enclosed Ground Flares for Cleaner and Safer Hydrocarbon Production in Mexico.” Abel Clemente-Reyes, Cecilia Martin-Del-Campo, Pamela F. Nelson, Alfonso Duran-Moreno. *Cleaner Engineering and Technology*, Volume 16, 2023, 100671, ISSN 2666-7908, <https://doi.org/10.1016/j.clet.2023.100671>)

- iii. Per publicly available data, the two (2) land parcels on which the MarkWest Harmon Creek Gas Plant is located are approximately 110 acres, combined, of which only 34.7 acres appear to be currently utilized for plant surface equipment. Please provide justification for the need to acquire more land to accommodate multiple ECDs.

[25 Pa. Code §127.12(a)(2), 25 Pa. Code §127.12(a)(5)]

10. As noted previously, per 25 Pa. Code §127.12(a)(5), an application for plan approval must “[s]how that the emissions from a new source will be the minimum attainable through the use of the best available technology. Per 25 Pa. Code §121.1, *best available technology (BAT)* is defined as the “[e]quipment, 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. Please address the following items in the supplied BAT analysis:

- a. Please provide a best available technology (BAT) analysis specific to the proposed “Harmon Creek 3 (III) Cryo” and “Harmon Creek DeEthanizer 2 (II)” projects.

- b. Reciprocating Compressor Rod Packing Vents

- i. From the supplied BAT analysis: “At the request of the Department, MPLX is providing a BAT analysis on rod packing emissions associated with the three (3) reciprocating compressors. A search for “rod packing” was conducted in the RBLC Database from 1/2017 through 9/2022 for all pollutants and no results were returned. Therefore, MPLX relied on technical expertise from the compressor manufacturer and facility personnel. MPLX contacted Ariel Corporation in May 2022 to explore options to reduce rod packing emissions associated with the compressors. Based on reference material provided and discussions with Ariel representatives, the standard Ariel packings meet or exceed today’s industry-standard requirements, and ongoing research and development efforts ensure the best possible seal. The new reciprocating compressors will be equipped with what Ariel identifies as low-emission packing.”

1. The above paragraph refers to documentation submitted in support of MarkWest’s application for PA-63-01011 for the construction of Harmon Creek 2. Please update the analysis and conduct and provide a current and comprehensive RACT/BACT/LAER Clearinghouse (RBLC) database search for capture and control of compressor rod packing emissions and similar sources including process vents. Please also inquire with Ariel Corporation and other reciprocating compressor manufacturers (Atlas Copco, Baker Hughes, Bauer, Blackmer, Caterpillar, and Gardner Denver, etc.) regarding currently available technology with respect to rod packing emissions capture.

2. Please provide documentation that substantiates the reciprocating compressor manufacturer's (Ariel Corporation) claims that "standard Ariel packings meet or exceed today's industry-standard requirements" and that the proposed "new reciprocating compressors will be equipped with what Ariel identifies as low-emission packing."
- ii. From the supplied BAT analysis: "In discussions with technical experts, risks were identified in association with the use of carbon adsorption canisters. The downstream design pressure from rod packing vents is 1440 psi, and with the obstruction of a vent line, back pressure could result in a dangerous overpressure of a carbon canister."

AND

"Another option to reduce emissions from low-pressure vents is by routing vents to a vapor recovery unit (VRU). The estimated range to acquire and install a VRU is approximately \$1-2M. Because these vents are located throughout the facility, multiple VRUs and significant amounts of piping would be required to recover these vapors. The cost per ton reduction from just one (1) VRU, without considering the operation and maintenance, over a ten-year period would range from approximately \$218,000/ton to \$436,000/ton."

1. It is the Department's understanding that check valves, over-pressure check valves, pressure regulators, and pressure relief devices are available that would provide the necessary pressure and flow control to prevent an equipment over-pressure condition. Additionally, Per the *Reciprocating Compressors Technical Guidance Document (TGD)* available on the *Oil and Gas Methane Partnership 2.0 (OGMP 2.0)* website (<https://ogmpartnership.com/guidance-documents-and-templates/>), "[i]t is also possible to capture and redirect the [rod packing vent pipe] emitted gas stream to a useful outlet or to a flare." Please include a thorough evaluation of technical feasibility to capture rod packing emissions since the location and number of low-pressure vent emissions points, and required tubing, manifolds, and piping do not constitute technical infeasibility. Please include these elements and considerations in the EPA OAQPS control cost analyses.
2. Control cost values are to be presented in dollars per ton of each target pollutant controlled and supported by EPA OAQPS cost calculations. Please revise.

3. Per the Department's research and given the similarity of VRU control of turbine compressor dry seals vents and storage tanks vents, capturing reciprocating compressor rod packing emissions is technically feasible. For example, Eagle Pump & Compressor, LTD's Emission Capture compressors "...are a proven solution for recovering sweet and sour vent gas from reciprocating compressor rod packing, distance piece purges or centrifugal compressor shaft seals." (<https://www.eagle-pc.com/gas-compression-vapor-recovery/>) Please address.

c. Centrifugal Compressor Dry Seal Vents

- i. Capturing emissions from centrifugal compressor dry seal vents was proposed in the application form but was not discussed or evaluated in the supplied BAT analysis. Please include.

d. Measurement Device Vents

- i. From the supplied BAT analysis: "One known risk is the possible contamination of the sensitive GC equipment due to potential flowback. However, this method is not practiced at MPLX facilities, and other potential challenges and risks are unknown. The estimated cost is approximately \$200,000 per vent to route vent streams to the closed drain. Eight (8) measurement device vents are proposed and the total installation cost would be approximately \$1.6M to control 0.26 tpy VOC."
 1. It is the Department's understanding that check valves, over-pressure check valves, pressure regulators, and pressure relief devices are available that would provide the necessary pressure and flow control to prevent vent line backflow from adversely affecting the measurement equipment. Further, unknown risks should not be cited for technical infeasibility. Please provide a thorough BAT evaluation for capturing measurement device vent emissions.

[25 Pa. Code §127.12(a)(2), 25 Pa. Code §127.12(a)(5)]

Please be aware that per the *Policy for Implementing the Department of Environmental Protection (Department) Permit Review Process and Permit Decision Guarantee* (021-2100-001, November 2, 2012) ("PRP/PDG Policy"), a Permit Decision Guarantee is provided for certain Air Quality authorization applications, where the Department's guarantee timeframe for this application type is 150 business days. However, it is the applicant's responsibility for submitting a complete and technically adequate application which meets all applicable regulatory and statutory requirements and contains all information needed by the Department to make a final permit decision. Pursuant to Section B(6) of the PRP/PDG Policy, the above technical deficiencies have voided the Permit Decision Guarantee for this application. The deficiencies have also stopped the PAYBack program

review clock established under Executive Order 2023-07, which provides a review timeframe for this application type of 160 business days.

You must submit a response fully addressing each of the technical deficiencies set forth above within thirty (30) business days of receipt of this correspondence or the Department may deny the application. If you believe that any of the stated deficiencies is not significant, you have the option to request that the Department make a decision based on the information with regard to the subject matter of that deficiency that you have already made available. If you choose this option with regard to any deficiency, you should explain and justify how your current submission satisfies that deficiency. Please be aware that per §127.12(b), “[t]he Department will not approve an application which fails to meet the requirements of [§127.12(a)].”

I hope you find this information helpful in understanding the application review process. Please visit eFACTS on the Web at: <https://www.ahs.dep.pa.gov/eFACTSWeb/default.aspx> to follow your application through the review process. If you have questions about your application or would like to discuss any of the above items, please contact me at 412.442.5231 or via email at dtomko@pa.gov.

Sincerely,

Devin P. Tomko, P.E./DPT
Air Quality Engineer

CC: PA-63-01011B
Operations (Beth Speicher)
New Source Review (Sheri Guerrieri)
OnBase