From:	Juarez, Allie M.
To:	Tomko, Devin
Cc:	Gorog, Mark; Guerrieri, Sheri; Shaffer, Valerie; Heilman, Michael; Greenert, Brian L.; Trivedi, Viren; Wheldon, Nathan M.; Scott, Harold R.; Haley, Tim M.
Subject:	RE: [EXTERNAL] Application for PA-63-01011B - MarkWest Liberty Midstream & Resources, LLC / Harmon Creek Gas Plant
Date:	Tuesday, November 26, 2024 3:15:16 PM
Attachments:	image001.png 2024-1126 Second Technical Deficiency Response.pdf Submission Confirmation.pdf

Good afternoon Devin,

Please find MPLX's response to the technical deficiency/pre-denial letter attached. Due to the file size, the requested compiled response document has been submitted via PADEP's Public Upload website. In addition, a confidentiality request for proprietary information included in the flare specifications document and the document itself has been submitted online. The submission details have been attached for your reference.

Please let us know if you have any questions.

Thank you,
Allie

Allie Juarez
Environmental Engineer
4600 J Barry Court, Suite 500
Canonsburg, PA 15317
Mobile: 412-815-8886
ajuarez@marathonpetroleum.com

From: Tomko, Devin <dtomko@pa.gov>
Sent: Tuesday, November 12, 2024 3:03 PM
To: Juarez, Allie M. <AJuarez@marathonpetroleum.com>
Cc: Gorog, Mark <mgorog@pa.gov>; Guerrieri, Sheri <shguerrier@pa.gov>; Shaffer, Valerie <valshaffer@pa.gov>; Heilman, Michael <mheilman@pa.gov>; Greenert, Brian L. <bgreenert@pa.gov>; Trivedi, Viren <vtrivedi@pa.gov>
Subject: [EXTERNAL] Application for PA-63-01011B - MarkWest Liberty Midstream & Resources, LLC / Harmon Creek Gas Plant

Good Afternoon Allie,

Please find attached the second technical deficiency/pre-denial letter for the MarkWest Liberty Midstream & Resources, LLC, application for Plan Approval PA-63-01011B for the "Harmon Creek III" project proposed at the Harmon Creek Gas Plant. Please let us know when would like to discuss the items in the letter.

Sincerely,

Devin P. Tomko, P.E. | Air Quality Engineer
Pennsylvania Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive | Pittsburgh, PA 15222
Phone: 412.442.5231 | Fax: 412.442.4194
www.depweb.state.pa.us

DEP accepts permit and authorization applications, as well as other documents and correspondence, electronically through ePermitting and Public Upload with Electronic Payment. Please use the link below to view the webpage, get instructions, and submit documents: https://www.dep.pa.gov/DataandTools/ElectronicSubmissions/Pages/default.aspx

MarkWest Liberty Midstream & Resources, L.L.C.
1515 Arapahoe Street
Tower 1, Suite 1600
Denver, CO 80202-2126
(800) 730-8388
(303) 290-8700
(303) 825-0920 Fax

November 26, 2024

Devin P. Tomko, P.E./DPT
Air Quality Engineer
PA DEP SW Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

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

Dear Devin P. Tomko, P.E./DPT:

MarkWest Liberty Midstream & Resources, L.L.C. ("**MPLX**") is providing this response to the pre-denial and second technical deficiency letter received on November 12, 2024, to which the Department gave MPLX only 10 business days to respond. The majority of the Department's requests were either previously addressed by MPLX and/or were items that were provided in the plan approval application and could have been requested in the initial technical deficiency letter. Nevertheless, MPLX has attempted to address all points raised in the Department's letter. To that end, please find MPLX's responses, including references to the application and previous correspondence for items that have already been supplied.

1. The Department asserts that the documentation submitted by MPLX does not demonstrate that the proposed control technology for the Harmon Creek 3 Plant ("**HC3**") meets the applicable Best Available Technology standard. However, the Department fails to explain why MPLX has not met the applicable BAT standard or identify a single deficiency in MPLX's submittal. As the Department is aware, MPLX conducted detailed BAT analyses evaluating the technical and economic feasibility of controlling the HC3 sources with an enclosed combustor. These analyses were conducted by first evaluating the technical feasibility of alternative controls and obtaining quotes from vendors based on equipment that could be utilized at the facility in a safe manner and of the appropriate size. The potential reduction in emissions from an enclosed combustor was calculated and evaluated on a ten-year period to determine the cost per ton of emission reduction. As detailed in the BAT analysis provided to the Department on August 15, 2024, and in the follow-up letter to the Department on October 2, 2024, MPLX determined that an enclosed combustor has a minimal impact on emissions reduction and significant costs, over $400,000 per ton of VOC emissions. Based on the Department's own Comment and Response and Technical Support Documents relating to BAT, the installation of an enclosed combustor is not economically reasonable and accordingly does not meet the Department's BAT standard.

2. MPLX understands that the GP-5 only allows open flares for control of new or modified sources at remote locations and for infrequent operations. However, MPLX submitted a plan approval application for a case-by-case determination as the general permit is not intended to be a "binding-norm" and the BAT analysis provided to the Department on August 15, 2024 demonstrates that the installation of an enclosed combustor for these sources is not economically reasonable. Please see the BAT analysis and follow-up letter provided on October 2, 2024.

   As stated in the Department's Best Available Technology and Other Permitting Criteria (275-2101-007; February 23, 1996) ("BAT-TGD") Section 7.10 (Best Available Technology Criteria for Municipal Residue Landfills), "the requirements set forth in this document are for guidance purposes and are not meant to be a regulation" and "if an applicant proposes technology that is less effective than that specified in this document, then the application for the less effective technology must be accompanied by a feasibility analysis for all of the technologies considered and an economic evaluation of all the feasible technologies." Similar language is included in the GP-5 Technical Support Document (TSD) and while an open flare is not less effective than an enclosed combustor, MPLX has provided documentation that the economic impact of an enclosed combustor is beyond the thresholds listed in the GP-5 TSD.

   The *Best Available Technology Criteria for Municipal Residue Landfills* is not applicable to gas processing plants. The statement that emission streams are similar is vague and is not supported in the referenced document. Moreover, the use of enclosed combustion devices at landfills is not indicative of BAT for a project within the natural gas industry.

   a. MPLX has provided a BAT analysis for recompression with this response. Please find that evaluation in Attachment 1 of this response. The Texas Eastern Transmission, LP Holbrook Station project has gas recompression on their Solar turbines using Solar Turbine's proprietary gas release control technology. The HC3 project is not proposing the use of solar turbines and thus, this specific technology does not apply and has not been demonstrated in use at gas processing plants. Additionally, the 95% emission reduction from blowdowns is less effective than the proposed 98% DRE using the existing open flare.

   b. Energy Transfer Corporation Revolution Cryogenic Gas Processing Facility obtained a GP-5 for their process. MPLX is not familiar with ETC design or site-specific processes and thus, cannot speak to the feasibility or cost-effectiveness of that specific scenario. However, as stated in the Department's GP-5 Comment and Response Document Part 1 finalized in June 2018, "Owners and operators may, at their discretion, opt to undergo a case-by-case determination if these specifications and conditions may not be met for their individual facility." Furthermore, to avoid confusion, the Department clarifies that the GP-5 is not the floor for BAT determinations by stating "The Department disputes the implication that the standardized terms and conditions of a general permit constitute a 'binding norm' as suggested by the commentators. The use of a general plan approval or a general operating permit is not mandatory. An applicant seeking to authorize their facility may opt instead for a case-by-case plan approval, in which they must demonstrate the case-by-case BAT for methane and all other pollutants emitted by sources at the facility." As such, MPLX submitted a plan approval and has submitted the case-by-case analysis for BAT of the new sources.

3. The Department stated that MPLX "failed to include a complete evaluation of project and project emissions aggregation and/or circumvention (25 Pa. Code §127.216) for the process equipment and controls proposed in the subject application with those proposed and/or authorized in GP5-63-01011A, GP1-63-01011A, GP5-63-01011B, and Plan Approval PA-63-01011" and referenced 25 Pa. Code §127.12(a)(2, 4, and 5) as the justification for considering this a technical deficiency. The referenced sections under §127.12 are listed below:

> (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.
> (4) Show that the source will comply with applicable requirements of this article and requirements promulgated by the Administrator of the EPA under the Clean Air Act (42 U.S.C.A. § § 7401—7706).
> (5) Show that the emissions from a new source will be the minimum attainable through the use of the best available technology.

Section (5) does not appear to be applicable to the aggregation and/or circumvention request. The plan approval application submitted on January 17, 2024, included all forms required, which do not include aggregation and/or circumvention evaluations, and MPLX has been engaged in bi-weekly meetings with the Department during the permitting process for HC3. At no time, prior to receiving the pre-denial/second technical deficiency letter on November 12, 2024, has the Department indicated a need for or requested additional evaluation on aggregation and/or circumvention.

The *Clean Air Council v. DEP* case, which the Department requested MPLX to evaluate, is a case in which phasing or staging of a project was potentially used to avoid aggregating emissions sources for purposes of determining PSD and NSR applicability. As the Department noted MPLX has applied for and obtained air permits, as required, for the Harmon Creek Gas Plant as the facility has expanded. There is no basis for the Department to assert that MPLX has attempted to circumvent any of the Department's permitting requirements. To the extent the Department is asserting that MPLX should have permitted the facility as a major source from the outset of the development of the site, there is similarly no basis in fact or law for such a position. The timeline of MPLX's permitting activities demonstrates that each plant at the Harmon Creek site is a separate project.

MPLX gathering and processing facilities are designed and constructed in response to producer demand and, thus, are not planned until the need exists. MPLX initially permitted Harmon Creek 1 and 2 under a GP-5 on June 12, 2017 and commenced constructed thereafter. However, due to lack of producer demand, Harmon Creek 2 was not constructed within the time periods required under that permit. Accordingly, once producer demand justified construction of a second plant at the Harmon Creek site, MPLX obtained a separate plan approval for that facility on June 30, 2022. At that point in time, MPLX had no contractual obligation to construct a third plant at the Harmon Creek site nor had one been elected by the producer. It was not until the producer later elected the third plant at the Harmon Creek site, which required execution of significant contract documents to effectuate, that MPLX submitted its permit application for the facility. Under the *Clean Air Council* case, the only factor present here is physical proximity.

MPLX considered all facility emissions when permitting HC3 as a Title V source. However, that does not mean that the development of construction of three separate plants at the site constitutes one "project." As established above, there is no "temporary proximity" as there was in the *Clean Air*

Council case. Nor is there interdependence between the separate plants as there was with the facilities in *Clean Air Council*. Nor was there a common plan regarding construction of the three separate plants. Indeed, as described above, there are no plans to build additional plants unless and until a producer elects to have one constructed, which is outside of MPLX's control. Simply put, there is no basis to assert that MPLX has circumvented any of the Department's permitting requirements under applicable law.

4. The applicability of the Nonattainment New Source Review as given in 25 Pa. Code Chapter §127 Subchapter E pursuant to §127.203(e)(2) states:

> "If a particular source or modification becomes a major facility or major modification **solely** by virtue of a relaxation in an enforcement limitation which was established after August 7, 1980, on the capacity of the source or modification to emit a pollutant including a restriction on hours of operation, the requirements of this subchapter also apply to the source or modification as though construction had not yet commenced on the source or modification."

   With the application for the addition of HC3 and DeEthanizer II, MPLX has not requested the relaxation of enforcement limitations associated with any existing equipment as the Harmon Creek facility. The limitations for all unchanged sources remain the same, or in some instances have decreased as better information has become available. The only increase in emissions comes from new sources which includes additional heaters, additional fugitive emission components, additional compressors with rod-packing emissions and dry-seal vents, additional methanol tanks and additional measurement devices, all of which are required solely for the operation of Harmon Creek III and De-Ethanizer II. Furthermore, the additional emissions from the new processing equipment are below the significant emission increases as defined in 25 Pa. Code Chapter §121.1. Therefore, the requirements of the subchapter do not apply.

5. MPLX contacted the regenerative heater manufacturer to evaluate options to achieve <5 ppmv NOx with flue gas recirculation (FGR). The heater manufacturer has not proven the ability to reach <5 ppmv NOx on process heaters with FGR and would require factory testing before such technology could be offered. However, MPLX evaluated a burner option to reach lower NOx levels in the BAT analysis provided in Attachment 2 of this response. Based on the significant cost associated with minimal emission reductions equating to $199,523/ton NOx, MPLX is proposing the use of FGR to achieve 9 ppmv NOx.

6. Please find the manufacturer specifications for the existing process flare in Attachment 3 of this response. As calculated based on flare design information, the minimum flow is 39.27 scfm and the maximum flow is 364,511 scfm. The minimum heat input is 2.167 MMBtu/hr and the maximum heat input is 25,200 MMBtu/hr.

7. The "Estimated Potential Blowdowns (Controlled by Flare)" list has been updated, in Attachment 4, to include an approximate total elapsed time for blowdowns, the mass emission rate, and the volumetric emission rate. Please note that the elapsed time and emission rates vary based on the equipment size and operating parameters. The equipment blowdown times provided are based on typical durations observed by facility personnel.

Please find the operating guideline for equipment blowdowns in Attachment 5. Consistent with good air pollution practices, emissions from blowdowns are controlled by the process flare rather than routed to the atmosphere.

8. The PFD has been updated to include the compressors requested by the Department and can be found in Attachment 6 of this response. To simplify the PFD, information regarding the location in which blowdowns and venting are routed has been included separately. Please refer to the "Estimated Potential Blowdowns (Controlled by Flare)" list, in Attachment 4, which has been updated to indicate the plant location of each compressor and if maintenance blowdowns and compressor rod packing/dry seal venting are routed to the flare or atmosphere.

9. Regarding the request for a copy of the API Standard 537, as MPLX previously stated, the standard could not be distributed to the Department due to licensing restrictions. MPLX offered to review the API 537 Standard with the Department and can bring a copy to the face-to-face meeting in December to allow the opportunity to review siting requirements in the standard. The Department's need for access to specific standards, which it can obtain itself, should not be considered a technical deficiency of an application. Nevertheless, MPLX is providing the summary below relating to flare siting standards for the proposed project.

   MPLX is proposing to utilize the existing process flare as part of the HC3 plan approval application. As a result, there are no specific applications of the API 537 Standard related to the HC3 plan approval application. Generally, the only applications of the API 537 Standard for siting a flare are related to Thermal Radiation Shielding Considerations per Section D.1.4 and System design per Section 4.2. MPLX typically does not use shielding, and MPLX follows the spacing and design guidelines in API 521 which are referenced by these sections. Referencing API 521, Section 5.7.2.1 discusses the effect of thermal radiation on human skin which is considered into the design and siting of our flares. In accordance with API 521, MPLX sites its flares to minimize the effects of thermal radiation on both our personnel and the general public via spacing and restricted access. This requires the flare to be certain specified distances from other plant equipment and from adjacent property owners/structures. Access to the area around the flare is controlled/restricted via signage warning of the potential thermal radiation hazard along with physical controls, such as fencing, and administrative controls.

10. The assertion that additional property would be needed was based on the previous Harmon Creek 2 plan approval application BAT analysis, evaluating the installation of multiple enclosed combustion devices per the Department's request. The Flare BAT analysis for HC3 included a detailed write-up of the land use challenges associated with the installation of an enclosed combustor. Please review the written statements regarding land use in the second paragraph on page 1 of the Harmon Creek 3 Flare BAT analysis provided to the Department on August 15th, 2024. The analysis has been provided again in the compiled application/responses on page 223/279.

11. Please find the emission estimates for the closed drain and amine closed drain tanks in Attachment 7 of this response. The supporting data, assumptions including throughputs and basis for composition estimates, and calculation methodologies to establish the estimates are included in the notes of the calculation tables.

12. There is one reciprocating compressor which is in CO_2 service proposed for this project. As detailed in the application, VOC and methane emissions are negligible. However, the potential emissions were included in the application. The SCFH emission rate provided in the application was calculated based on the number of throws per compressor. The application conservatively assumed four throws, which equates to 480 SCFH. However, there are only two throws on this unit and each throw will be subject to the NSPS OOOOb compliance rate of 2 SCFM, which equates to 240 SCFH, whether manifolded or individually vented. The two rod packing vents are anticipated to be manifolded.

13. The previous BAT analysis was specific to the HC2 application as the technologies between the two projects had not changed at the time. As stated in the technical deficiency response sent to the Department on June 27, 2024, the BAT analysis for compressors and measurement device venting was corrected to be specific to the HC3 project. Please refer to the Compressor and Measurement Venting BAT Analysis provided to the Department on July 26, 2024 and included on page 217/279 of the compiled application/responses, which lists one reciprocating compressor, in the first sentence of the section titled *Reciprocating Compressor Rod Packing Vents,* and two residue centrifugal compressors and one regenerative centrifugal compressor, in the section titled *Centrifugal Compressor Dry Seal Vents*.

14. The screw compressors were accounted for in the plan approval application submitted on January 19, 2024. Each screw compressor is accounted for in the Estimated Potential Blowdowns (Controlled by Flare) table on page 99/132 and under the Fugitive Emissions table on page 101/132 of the initial plan approval application, and provided again on pages 101/279 and 103/279, respectively in the compiled response document. Additionally, in the regulatory review provided on page 112/132 of the initial plan approval application and again on page 114/279 of the compiled response document, MPLX states that the process unit equipment for HC3 will be subject to the NSPS OOOOb requirements. Finally, MPLX provided supporting documentation in the plan approval application for fugitive components and the Harmon Creek LDAR practices. Please find those details starting on page 126/132 of the initial application and provided again on page 128/279 in the compiled response document. Additional Fugitive Component BAT analysis has been provided in Attachment 2 of this response.

15. Please see the estimated volumes calculated from sources routed to flare listed below:

Source	Estimated Annual Volume (SCF)
Pigging	1,499,696
Blowdowns	415,522
Plant Shutdown	23,040,960
PSVs	2,438,456
Dry Seal Vents	529,627
Loadout	37,993
Closed Drain	11,428,105
Amine Closed Drain	583,890
Pilot and Sweep Gas	26,518,272
Total	**66,492,521**

Based on records and confirmation from facility operations personnel, MPLX expects flare volumes to remain consistent with current operations for the existing equipment ranging between 30.87 and 35.72 mmscf/yr. To account for the proposed equipment, the volume routed to the flare is conservatively doubled which results in an estimated 61.75 to 71.44 mmscf/yr. As such, MPLX is proposing to maintain the annual flare volume limit of 126.52 mmscf.

16. Harmon Creek has been complying with NSPS OOOOa requirements for process unit equipment since 2020 and has been submitting OOOOa reports to the US EPA as required. The construction of Harmon Creek 2 triggered a modification under NSPS OOOOb applicability for process unit equipment. As required, MPLX submitted an NSPS OOOOb report for the Harmon Creek process unit equipment in July 2024 to the US EPA. Additionally, there are no OOOOa sources being modified as part of this project that have not already been identified as OOOOb-applicable sources.

17. The plan approval application for the closed drains tanks included a throughput increase of 80,000 gallons per year, taking the previously permitted flow rate from 220,000 gallons per year to 300,000 gallons per year. The estimated potential emissions associated with the closed drain tanks are included, as requested, in response to #11 above. Finally, the closed drain tanks are a storage vessel affected facility subject to the NSPS OOOOb standards.

As requested, MPLX is also providing a PDF of all responses to the second technical deficiency letter, responses to the first technical deficiency letter, and the initial application in a compiled package.

MPLX appreciates the work of agency personnel thus far on the HC3 permit application. To that point, MPLX and the Department have met informally and frequently to work through the technical portions of the application. MPLX recently requested an additional face-to-face meeting with the Department (SWRO and Central) to further address details pertinent to this project. MPLX is appreciative of the Department's willingness to schedule the meeting on December 4th in Harrisburg and looks forward to this discussion.

Sincerely,

Alexandra M. Juarez
Environmental Engineer
MPLX Gathering & Processing

Enclosure(s)

cc: Mark Gorog (mgorog@pa.gov)
Sheri Guerrieri (shguerrier@pa.gov)
Valerie Shaffer (valshaffer@pa.gov)
Michael Heilman (mheilman@pa.gov)
Brian Greenert (bgreenert@pa.gov)
Viren Trivedi (vtrivedi@pa.gov)

Attachment 1

Vapor Recovery BAT Analysis

Best Available Technology Review

Existing Process Flare and Vapor Recovery Options

MarkWest Liberty Midstream and Resources, L.L.C., a fully owned subsidy of MPLX, hereinafter referred to as MPLX, is seeking authorization to construct and operate the Harmon Creek 3 Cryo (HC3) and a second de-ethanizer (De-Eth 2). During maintenance and emergency situations, MPLX will require the blowdown of equipment associated with HC3 and De-Eth 2. MPLX plans to route such vapors to the existing process flare. The most recent version of the GP-5 excludes the use of open flares, and therefore MPLX submitted a plan approval application seeking authorization to control HC3 with the existing process flare.

Vapor Recovery

As requested, MPLX evaluated the technical and economic feasibility for vapor recovery of sources from HC3 that are proposed to be controlled by the existing process flare.

Vapors from plant shutdowns and PSV lifts cannot be captured by a vapor recovery unit (VRU) due to high flow rates. All other sources routed to the existing flare, as listed in Table 2, have been evaluated for vapor recovery as a control option. For this evaluation, the VRU would be designed to capture 100% of the vapors while operating. However, the VRU would require downtime for maintenance and would operate for 85% of the year. During the period in which the VRU would be down, this evaluation assumes the vapors would be routed to the existing flare for a 98% DRE.

As shown in Table 2, the emission reduction between using the existing flare for HC3 sources and installing a vapor recovery unit is 2.12 tpy VOC. Based on the quoted cost for a vapor recovery unit, installation, and annual operating and maintenance costs, the ten-year cost per ton reduction of VOC would be approximately $622,162. MPLX would like to note, that if the VRU did not require maintenance downtime and was capable of capturing all emissions. The ten-year cost per ton reduction of VOC, based on 2.49 tpy, would be approximately $529,463.

Table 2. Potential emissions from HC3 are shown as controlled by the existing flare versus a vapor recovery unit.

	HC3 VOC Emissions (tpy)	
Source	Existing Flare	VRU
Pigging	0.10	0.01
Maintenance Blowdowns	0.03	0.00
Dry Seal Vents	1.40	0.21
Loadout Operations	0.29	0.04
Closed Drain Tank	0.68	0.10
Amine Closed Drain	0.00	0.00
Total	**2.49**	**0.37**

Due to the significant cost associated with a vapor recovery unit sized for this project, MPLX has determined that installing a VRU at the facility is not economically reasonable. Thus, MPLX proposes the use of the existing flare at the facility as BAT for this project.

Cost Estimate for
Vapor Recovery Unit

TOTAL CONSTRUCTION COST

AREA	COST
PIPING	$1,055,700.00
ELECTRICAL/INSTRUMENTATION	$491,300.00
CIVIL	$384,930.00
STRUCTURAL	$142,025.00
INDIRECTS AND OVERHEAD	$248,874.60
TOTAL COST	**$2,322,829.60**
Mob/Demob	$20,000.00
Equipment	$2,575,498.00
Enclosed Ground Flare	$1,500,000.00
Measurement	$350,000.00
Instrumentation	$100,000.00
Valves	$80,000.00
MCC	$80,000.00
GC Building	$465,498.00
Engineering	$200,000.00
Commissioning and Startup	$70,000.00
Contingency	$778,249.14
TOTAL	**$5,966,576.74**

Vapor Recovery BAT Cost Information

Year	MPLX Cost of Capital	Capital	Annual Operating	Annual Total	Annual Total with Cost of Capital
2025	8.96%	$ 5,966,577	$ 350,000	$ 6,316,577	$ 6,882,542
2026	8.96%	$ -	$ 350,000	$ 350,000	$ 415,530
2027	8.96%	$ -	$ 350,000	$ 350,000	$ 452,761
2028	8.96%	$ -	$ 350,000	$ 350,000	$ 493,329
2029	8.96%	$ -	$ 350,000	$ 350,000	$ 537,531
2030	8.96%	$ -	$ 350,000	$ 350,000	$ 585,694
2031	8.96%	$ -	$ 350,000	$ 350,000	$ 638,172
2032	8.96%	$ -	$ 350,000	$ 350,000	$ 695,352
2033	8.96%	$ -	$ 350,000	$ 350,000	$ 757,656
2034	8.96%	$ -	$ 350,000	$ 350,000	$ 825,542
2035	8.96%	$ -	$ 350,000	$ 350,000	$ 899,510
				Ten-Year Total	$ 13,183,618
				Tons Reduced Over Ten Years	24.90
				Ten-Year Cost/Ton Reduction	$ 529,463

Attachment 2

BAT Analysis for

Fugitive Emissions and the Regenerative Heater

Best Available Technology Review

Fugitive Components

The following control technologies were considered as part of the case-by-case analysis for fugitive components associated with all component groups, including compressors:

- Thermal Oxidation (TO)
- Regenerative Thermal Oxidation (RTO)
- Thermal Catalytic Oxidation (TCO)
- Carbon Adsorption
- Condensation
- Work Practice requirements

Thermal Oxidation (TO) and Regenerative Thermal Oxidation (RTO)

Thermal oxidation refers to the complete gas-phase combustion of VOCs to carbon dioxide and water vapor. Oxidation is achieved by heating the VOC exhaust in the presence of oxygen. Supplemental fuel (natural gas) is required to maintain combustion conditions. The destruction efficiency of thermal oxidation is typically 95% or greater with a combustion temperature of 1500 deg F and a retention time of 1.0 second. This is also dependent upon the quantity of VOC in the gas stream. For low-concentration VOC streams, a lower destruction efficiency can be expected. Thermal oxidation can be accomplished with or without heat recovery. Because these sources are throughout the plant, ductwork would have to be installed over every fugitive component. The installation of ductwork over every component is not technically feasible, and we have dismissed this option. There are no similar sources that are controlled in this manner.

Thermal Catalytic Oxidation (TCO)

Catalytic oxidation refers to complete combustion of VOCs to carbon dioxide and water through the use of an oxidation catalyst. Catalytic oxidation occurs at lower temperatures typically between 650 deg and 800 deg F. As with thermal oxidation, supplemental fuels (natural gas) is needed with dilute gas streams. Destruction efficiencies of 95% are typical. The catalyst slowly degrades over time and must be replaced on a periodic basis. Because these sources are throughout the plant, ductwork would have to be installed over every fugitive component. The installation of ductwork over every component is not technically feasible, and we have dismissed this option. There are no similar sources that are controlled in this manner.

Condensation

VOCs can be removed in the condensation process. This technology has been used in some cases to control high VOC concentration gas streams. In fact, in certain areas of the plant, where there are very low temperatures the gas is in liquid form. In gas streams consisting of a single VOC and no non-condensable gas, condensation occurs isothermally, or at a constant temperature. In gas streams consisting of non-condensables or VOCs with varied volatilities, condensation occurs along a temperature change. However, to achieve condensation of the vapor, ductwork would be required to capture the vented vapor from every component and vessels for the condensation process would be required. As stated earlier, the installation of ductwork over every fugitive component is not technically feasible and condensation is not an option for these sources. There are no similar sources that are controlled in this manner.

Adsorption

VOCs can be removed using carbon or zeolites as adsorbents. However, these sources are throughout the plant and ductwork would be required over every fugitive component. Installing ductwork over every component within the facility is not technically feasible, and this option has been dismissed. There are no similar sources that are controlled in this manner.

Work Practice

The facility will be subject to the Equipment Leak Standard in 40 CFR Part 60 Subpart OOOOb (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution in accordance with the provisions in 60.5400b. Additionally, as a best management practice, new PORVs installed at the facility are equipped with bottom dome piping, new and replacement valves are low-emission valves.

Conclusion

Best Available Technology shall be to operate using good air pollution practices and to conduct a Leak Detection and Repair (LDAR) program as recommended in 40 CFR Part 60 Subpart OOOOb and continue to follow MPLX's best management practices.

Regenerative Heater

Based on a search in the RACT/BACT/LAER Clearinghouse (RBLC), the lowest value for NOx emissions for process heaters is 9 ppmv NOx. Additionally, in November 2022, the Department determined that the 9 ppmv NOx was BAT for the Harmon Creek 2 regenerative heater based on the GP-1 for the operation of combustion units. Thus, MPLX is proposing the same level of control through flue gas recirculation on the HC3 regenerative heater.

However, in response to the Department's request, MPLX contacted two vendors to evaluate options. One vendor does not have the technology available to reach <5ppmv NOx using flue gas recirculation without requiring factory testing. The second vendor has proven technology to reach <5 ppmv NOx and provided a quote to MPLX for BAT cost analysis purposes.

As detailed in Table 1, the capital cost for the equipment and installation is approximately $755,000 and the annual operating and maintenance costs are approximately $5,000 per blower, with two blowers required. The emission reduction for this heater is 0.508 tpy NOx. Thus, the cost-per-ton reduction over a 10-year period is approximately $199,523.

In February 2022, the Department's SWRO reviewed a BAT analysis for the combustion of natural gas in a turbine which included the evaluation of an emission reduction from 15 ppmv NOx to 9 ppmv NOx. The Department made the determination that the cost to reduce emissions from 15 ppmv NOx to 9 ppmv NOx was not economically feasible due to the high removal cost of $12,858 to $16,351/ton NOx removed. The cost to reduce combustion emissions from 9 ppmv to <5 ppmv is more than ten times the cost that was determined infeasible to reach 9 ppmv.

Thus, considering the high cost and the low reduction in emissions, MPLX is proposing flue gas recirculation on the regenerative heater to achieve 9 ppmv NOx as BAT.

Table 1. Cost information supporting regenerative heater BAT analysis.

Year	MPLX Cost of Capital	Capital	Annual Operating	Annual Total	Annual Total with Cost of Capital
2025	8.96%	$755,000	$10,000	$765,000	$833,544
2026	8.96%	-	$10,000	$10,000	$11,872
2027	8.96%	-	$10,000	$10,000	$12,936
2028	8.96%	-	$10,000	$10,000	$14,095
2029	8.96%	-	$10,000	$10,000	$15,358
2030	8.96%	-	$10,000	$10,000	$16,734
2031	8.96%	-	$10,000	$10,000	$18,233
2032	8.96%	-	$10,000	$10,000	$19,867
2033	8.96%	-	$10,000	$10,000	$21,647
2034	8.96%	-	$10,000	$10,000	$23,587
2035	8.96%	-	$10,000	$10,000	$25,700

Ten-Year Total	$1,013,575
Tons Reduced in Ten Years	5.08
Cost/Ton Reduction	$199,523

Attachment 3

Flare Specifications

Provided in a separate document with a confidentiality request

November 26, 2024

Devin P. Tomko, P.E./DPT
Air Quality Engineer
PADEP Southwest Regional Office
400 Waterfront Dr.
Pittsburgh, PA 15222-4745

Re: Confidentiality Request
Application No. PA-63-01011B
MarkWest Liberty Midstream and Resources, L.L.C.
Harmon Creek Gas Plant
Smith Township, Washington County

Dear Devin P. Tomko, P.E./DPT:

MarkWest Liberty Midstream and Resources, L.L.C. (MPLX) would like to request confidential treatment for information in the document named "D-0701 Flare”, which is being provided to the Department in response to a technical deficiency letter. MPLX has previously received permission to share this manual with the Department for permitting purposes. The pages listed in Table 1 below include information that, if made public, would divulge production or sales figures or methods, processes or production unique to the manufacturer or would otherwise tend to affect the competitive position of the manufacturer adversely by potentially revealing trade secrets, including intellectual property rights.

Table 1. Confidential Information Log

Document	Page # in Document	Description	Basis for Confidential Treatment as Identified in the Pennsylvania Air Pollution Control Act, 35 P.S. § 4013.2
D-0701 Flare	1-90	Operation and Maintenance Manual for MarkWest Air Assisted Flare System	As stated in the document, the information in the manual is confidential and proprietary.

Should you have any questions, don't hesitate to contact me at ajuarez@marathonpetroleum.com or (412) 815-8886.

Sincerely,

Alexandra M. Juarez
Environmental Engineer

Attachment 4

Updated Estimated Potential Blowdowns Table

MarkWest Liberty Midstream & Resources, L.L.C.

Harmon Creek Gas Plant

Estimated Potential Blowdowns (Controlled by Flare)

Compressor	Location	Description	Rated HP[a]	Blowdown frequency per year	Est. Elapsed Time (mins)[f]	Mass Emission Rate (lb/hr)	Volumetric Flowrate (scfm)	Operating pressure (PSIG)	Volume Gas or Liquid (ft^3)	Product	Z-factor	MW	Volume Routed to Flare (scf)	Mass Routed to Flare (lb)	VOC Wt%	VOC Emissions (lbs)	HAP wt%	HAP Emissions (lbs)	Methane wt%	Methane Emissions (lbs)	CO2 wt%	CO2 Emissions (lbs)	Blowdowns to Flare or Atmosphere	Compressor Packing or Dry Seal Vents
C-1111	Cryo-1	Regen Centrifugal	150	6	15	162.8	48.6	1,100.00	20	Inlet	0.71	21.17	730	41	23.886%	9.724	0.409%	0.166	77.010%	31.352	0.212%	8.626%	Flare	Flare
C-2111	Cryo-2	Regen Centrifugal	150	6	15	162.8	48.6	1,100.00	20	Inlet	0.71	21.17	730	41	23.886%	9.724	0.409%	0.166	77.010%	31.352	0.212%	8.626%	Flare	Flare
C-1121	Cryo-1	Centrifugal w/ no drive	19700	6	30	1856.9	714.9	400.00	2681	Residue	0.95	17.04	21446	928	0.109%	1.013	0.000%	0.000	95.123%	883.156	0.528%	489.990%	Flare	No Vents
C-2121	Cryo-2	Centrifugal w/ no drive	19700	6	30	1856.9	714.9	400.00	2681	Residue	0.95	17.04	21446	928	0.109%	1.013	0.000%	0.000	95.123%	0.000	0.528%	0.000%	Flare	No Vents
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	Atmosphere
C-1151		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-1			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
C-1152		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-1			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
C-1153		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-1			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
C-1154		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-1			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	Atmosphere
C-2151		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-2			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	Atmosphere
C-2152		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-2			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
				6	20	125.7	48.4	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	Atmosphere
C-2153		Recip	5000	6	20	305.5	117.6	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
	Cryo-2			6	20	206.1	79.3	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	Atmosphere
C-1179	Deeth-1	Centirfugal	100	6	15	121.2	26.2	495.00	14	Ethane	0.57	30.07	394	30	0.001%	0.000	0.001%	0.000	0.000%	0.000	0.001%	0.030%	Flare	Flare
C-1140	Cro-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1141	Cro-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1142	Cro-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1155	Deeth-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1156	Deeth-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1157	Deeth-1	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-2141	Cro-2	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-2142	Cro-2	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-2140	Cro-2	Screw	1500	6	20	446.9	65.3	297.00	204	Propane	0.84	16.04	1307	149	100.000%	148.971	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
C-1191		Recip	900	6	20	197.0	58.9	285.00	122	Inlet	0.71	21.17	1177	66	23.886%	15.687	0.409%	0.268	77.010%	50.577	0.212%	13.915%	Flare	Atmosphere
	Stabilzer			6	20	741.1	221.4	1,117.00	122	Inlet	0.71	21.17	4428	247	23.886%	59.006	0.409%	0.268	77.010%	50.577	0.212%	13.915%	Flare	Atmosphere
C-1192		Recip	900	6	20	196.3	58.6	285.00	122	Inlet	0.71	21.17	1173	65	23.886%	15.626	0.409%	0.268	77.010%	50.577	0.212%	13.915%	Flare	Atmosphere
	Stabilzer			6	20	741.1	221.4	1,117.00	122	Inlet	0.71	21.17	4428	247	23.886%	59.006	0.409%	0.268	77.010%	50.577	0.212%	13.915%	Flare	Atmosphere
				6	15	9.3	1.3	25.00	10	CO2	0.94	43.57	20	2	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
C-0501		Recip	75	6	15	12.5	1.8	40.00	10	CO2	0.94	43.57	27	3	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
				6	15	51.4	7.5	210.00	10	CO2	0.94	43.57	112	13	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
	OSBL			6	15	99.5	14.4	420.00	10	CO2	0.94	43.57	217	25	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
				6	15	9.3	1.3	25.00	10	CO2	0.94	43.57	20	2	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
TBD		Recip	75	6	15	12.5	1.8	40.00	10	CO2	0.94	43.57	27	3	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
				6	15	51.4	7.5	210.00	10	CO2	0.94	43.57	112	13	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
	OSBL			6	15	99.5	14.4	420.00	10	CO2	0.94	43.57	217	25	0.001%	0.000	0.001%	0.000	0.000%	0.000	100.00%	231.876%	Flare	Atmosphere
TBD	Cryo-3	Centrifugal	150	6	15	162.8	48.6	1,100.00	20	Regen/Inlet	0.71	21.17	730	41	23.886%	9.724	0.409%	0.166	77.010%	31.352	0.212%	8.626%	Flare	Flare
TBD	Deeth-2	Centirfugal	100	6	15	121.2	26.2	495.00	14	Ethane	0.57	30.07	394	30	0.001%	0.000	0.001%	0.000	0.000%	0.000	0.001%	0.030%	Flare	Flare
TBD	Cryo-3	Screw	2250	6	20	670.4	98.0	297.00	306	Propane	0.84	16.04	1960	223	100.000%	223.457	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
TBD	Cryo-3	Screw	2250	6	20	670.4	98.0	297.00	306	Propane	0.84	16.04	1960	223	100.000%	223.457	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
TBD	Cryo-3	Screw	2250	6	20	670.4	98.0	297.00	306	Propane	0.84	16.04	1960	223	100.000%	223.457	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
TBD	Deeth-2	Screw	3500	6	20	1042.8	152.5	297.00	476	Propane	0.84	16.04	3049	348	100.000%	347.600	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
TBD	Deeth-2	Screw	3500	6	20	1042.8	152.5	297.00	476	Propane	0.84	16.04	3049	348	100.000%	347.600	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
TBD	Deeth-2	Screw	3500	6	20	1042.8	152.5	297.00	476	Propane	0.84	16.04	3049	348	100.000%	347.600	0.001%	0.001	0.000%	0.000	0.000%	0.000%	Flare	No Vents
				6	30	83.8	32.3	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	No Vents
TBD		Centrifugal	20000	6	30	203.7	78.4	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	No Vents
	Cryo-3			6	30	137.4	52.9	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	No Vents
				6	30	83.8	32.3	385.00	125.5	Residue	0.95	17.04	968	42	0.109%	0.046	0.000%	0.000	95.123%	39.848	0.528%	22.108%	Flare	No Vents
TBD		Centrifugal	20000	6	30	203.7	78.4	705.00	162.3	Residue	0.91	17.04	2352	102	0.109%	0.111	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	No Vents
	Cryo-3			6	30	137.4	52.9	1,210.00	60.8	Residue	0.86	17.04	1587	69	0.109%	0.075	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	No Vents
TBD	Cryo-3	Centrifugal w/ no drive	19700	6	30	63.5	24.5	1,210.00	60.8	Residue	1.86	17.04	734	32	0.109%	0.035	0.000%	0.000	95.123%	96.868	0.528%	53.744%	Flare	No Vents
--	Various	Misc. Maintenance Activities	--	64	Varies	--	--	1,200.00	500	Inlet	0.71	21.17	207761	11591	23.886%	2768.661	0.409%	47.387	77.010%	8926.448	0.212%	2455.953%	Flare	--
--	Plant	Plant Shutdown	--	1	120-480	80,343-321,372	24,001-96,004	--	--	Inlet	0.71	21.17	11520480	642744	23.886%	153523.978	0.409%	2627.624	77.010%	494977.093	0.212%	##########	Flare	--
											Total Volume to Flare		23,715,500		Total (lbs)	319058.39		2676.607		507453.244		1423.817		
														Potential	Controlled (lbs)	6381.17		53.53		10149.06		28.48		
															Controlled (tpy)	3.19		0.03		5.07		0.01		

[a] Maintenance blowdown frequencies and volumes listed are estimates and may vary. Maintenance blowdown emissions are controlled by the flare and accounted for in the flare emissions section.

[b] Volumes of compressors based on engineering estimates or calculated using CATG3612 at 483.1 acf and scaled to horsepower from 3550.

[c] Miscellaneous maintenance activities, such as filter change outs, are included for conservatism.

[d] The plant shutdown volume is based on estimates from actual flare meter data and a conservative factor of 3 is applied to the volume to account for HC2 and HC3.

[e] A factor of 2.0 is applied to the total blowdown volume to flare for conservatism.

[f] The elapsed time for each blowdown will vary based on equipment size and operating parameters.The elapsed times and mass and volumetric flowrates provided are estimates based on typical blowdown times for each unit.

Calculation Methodology

Emissions (lbs) = ((Operating P (PSIG) + Standard P (14.7 PSIG)) x Volume x MW) / (R (1545 ft lb/lb-mol R) x Standard Temp (60 F) x Z-Factor) x Pollutant wt% x # Events x Control Efficiency (1-98%)

Attachment 5

Operating Guideline for Blowdowns

Procedure Risk Category:	Procedure Risk Ranking:	Procedure Category:
Low	1.2.1	Normal Operations

PROCEDURE APPROVALS:

Note: Signature indicates that the Procedure Review process outlined in the Operating Procedure Standard (OPS-STD-003) has been completed and all action items resolved. Operations Supervisor/Manager has signed and issued approval for implementation and authorization for use.

Operations Supervisor/Manager	11-19-24 Date
Operations Specialist	11/19/2024 Date
Operator	11/19/2024 Date

1 PURPOSE

1.1 This Procedure provides guidance on depressurizing and de-inventorying stored hydrocarbon energy during Energy Isolation for all applicable MPLX G&P equipment in preparation for invasive work.

2 SCOPE

2.1 **Initial Condition:** Equipment has been shut down but remains pressurized or inventoried.

2.2 **Final Condition:** Equipment has been isolated per the Energy Isolation standard and depressurized / de-inventoried in preparation for invasive work.

3 PRE-CAUTIONS

3.1 <u>Health and Safety Precautions</u>

3.1.1 Minimum Personal Protective Equipment (PPE) is covered by the Personal Protective Equipment Standard, SAF-STD-0001. General Personal Protective Equipment (PPE) requirements are covered by training.

3.1.2 Natural Gas Liquids (NGL) / Liquefied Petroleum Gases (LPG) are extremely flammable. Keep away from heat, sparks, and open flame. Forms explosive mixtures with air. Based on type of hydrocarbon, some NGL may initially be heavier than air and spread along ground and will settle into low lying areas. Vapors may cause dizziness or asphyxiation without warning. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Do not depend on odor as warning of dangerous air concentrations. Avoid exposure to liquid or cryogenic gas vapor. Refer to SDS for proper PPE and additional information.

4 REFERENCES

4.1 SAF-STD-0014, Energy Isolation Standard

4.2 ASME B31.3, B31.3 ASME Process Piping Code Design

4.3 SP-50-14, Rubber and Corrugated Metal Hoses

5 DEFINITIONS

5.1 Control Device:

A device used to control emissions to the atmosphere. This could include Flares, VRUs, Enclosed Flares, Thermal Oxidizers and Combustors if applicable.

5.2 Closed Vent System:

Any system that goes to a control device. This could start but is not limited to PSVs, Reciprocal Compressor Rod Packing or Centrifugal Compressor Dry Seal Vents. The system ends at the control device.

5.3 P&IDs

Piping and Instrumentation Diagrams

6 PRE-MAINTENANCE ACTIVITIES

6.1 N/A

7 PROCEDURE

7.1 Isolation

_____/_____ 7.1.1 Plant Operator: **Utilize** Plant P&IDs to identify isolation points for the equipment to be deenergized and de-inventoried.

_____/_____ 7.1.2 Plant Operator: **Ensure** equipment is shutdown and ready per console operator's guidance for energy isolation.

_____/_____ 7.1.3 Plant Operator: **Ensure** I&E has deenergized and locked breakers for power supply to equipment if applicable.

_____/_____ 7.1.4 Plant Operator: **Close and lock** all block valves necessary nearest to the equipment to minimize amount of hydrocarbon blowdown.

NOTE:	**If applicable, reduce pressure / volume by equalizing with lower system pressures.**

_____/_____ 7.1.5 Plant Operator: **Identify** piping to be used for de-inventory of vapor/liquid in equipment. If necessary, hook up hosing to flare header using appropriately rated hoses and manifolds with whip checks properly installed.

CAUTION:	**FACILITY PIPING TEMP RATINGS ARE AS FOLLOWS:** **CARBON STEEL: -20 F** **LOW TEMPERATURE CARBON STEEL: -50 F** **STAINLESS STEEL: -325 F**

7.2 De-Inventory

NOTE:	**If utilizing hoses, utilize a properly-rated temporary valve within the hose setup boundaries as a throttle valve to mitigate fatigue of permanently installed valves within the process.**

_____/_____ 7.2.1 Plant Operator: **Inform** Control Room that de-inventory process (blowdown) will begin.

_____/_____ 7.2.2 Console Operator: **Monitor** flare opacity during the de-inventory process to ensure alarm setpoints are not exceeded.

NOTE:	**Hi Alarm is set at 1500 mscfd per the alarm flow faceplate**

_____/_____ 7.2.3 Plant Operator: **Slowly open** blowdown valve until flow is established.

_____/_____ 7.2.4 Console Operator: **Monitor and communicate** flow to the flare along with temperature indicators near the blowdown point.

_____/_____ 7.2.5 Plant Operator: **Monitor** local temperature and pressure indicators to adjust blowdown rate if needed based on temperature of piping, flare opacity and/or pressure drop rate.

_____/_____ 7.2.6 Plant Operator: **Utilize** Nitrogen, if necessary, to sweep remaining hydrocarbon from the equipment after initial depressurization / de-inventory. Sweep nitrogen through equipment to flare until hydrocarbon free or at an acceptable level for procession of work.

CAUTION:	**AVOID NITROGEN INHALATION ALWAYS REMAIN UPWIND WHILE VENTING. SERIOUS INJURY OR DEATH DUE TO ASPHYXIATION CAN RESULT.**

_____/_____ 7.2.7 Plant Operator: **Disconnect** temporary hosing and manifolds once equipment has been proven to be depressurized and swept with nitrogen.

8 PROCEDURE CLOSEOUT:

8.1 Select the appropriate statement and sign below:

	This Procedure was executed **as written**. Return to the Operations Specialist or Designee to complete Section 8.3.
	This Procedure was executed **with changes**. Return to the Operations Specialists to complete Sections 8.2.

Operator Date

8.2 This Procedure with changes has been reviewed with the Operations Specialists and updates have been approved or denied. The Procedure has been reviewed and all applicable changes have been made to subsequent Procedures. Refer to Operating Procedure Standard GST-OPS-0085 for change management.

	The Procedure updates/redlines are **approved.** Operations Specialist or Designee to complete Section 8.3.
	The Procedure updates/redlines are **denied.** Operations Specialist or Designee to complete Section 8.3.
Review Comments:	

Operations Supervisor/Manager Date

Operations Specialist Date

8.3 This document has been retained based on corporate record retention policies by the operations specialist or designee.

Operations Specialist or Designee Date

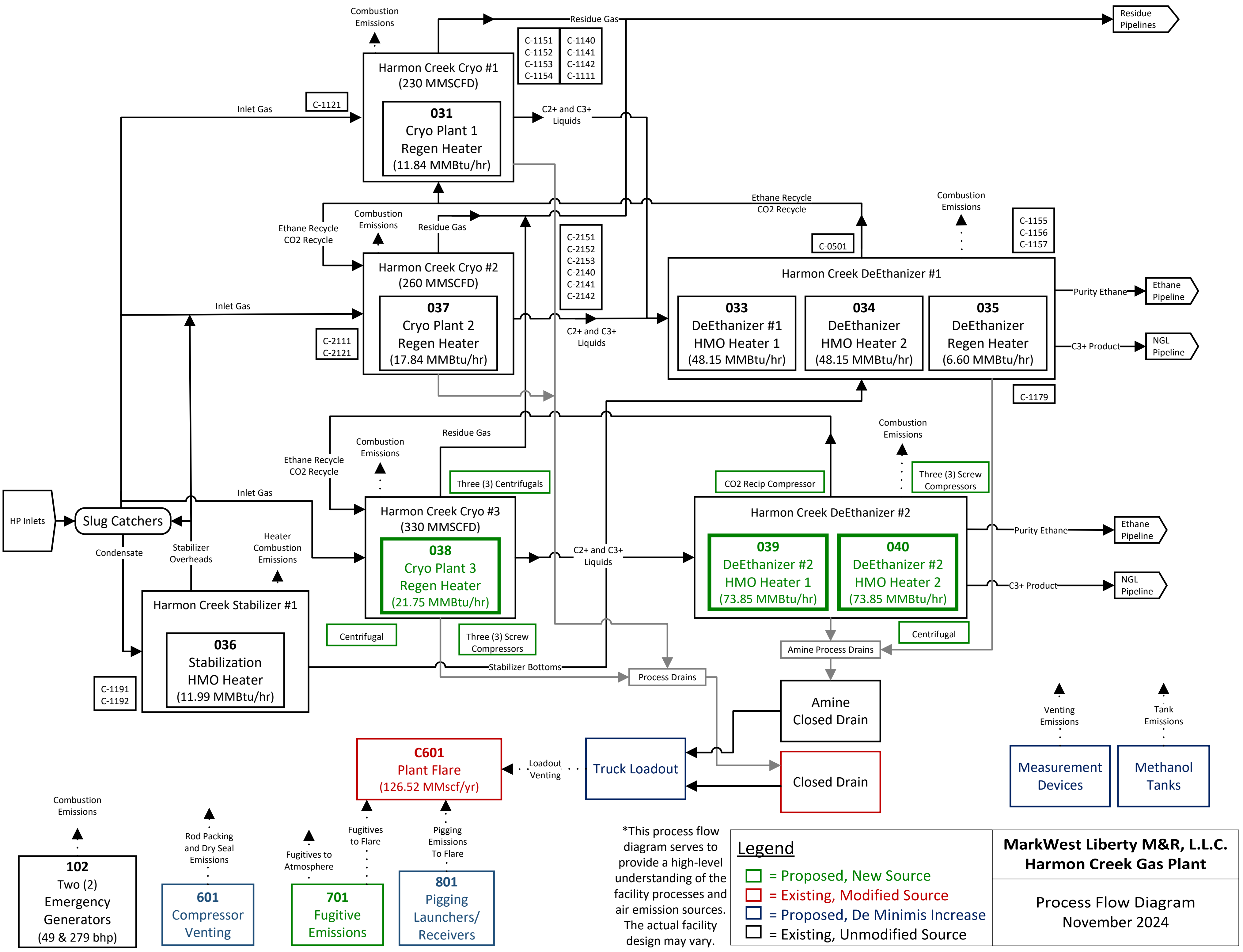
9 REVISION HISTORY

9.1 Record of Changes

Revision Number	Description of Change	Requested by	Approved by	Revision Date	Effective Date
0	Initial Release of Document	Jakob Potts	Donnie Kidd	11/19/2024	11/19/2024

Attachment 6

Updated Process Flow Diagram


Residue Gas
Residue Pipelines
Combustion Emissions
Harmon Creek Cryo #1 (230 MMSCFD)
031 Cryo Plant 1 Regen Heater (11.84 MMBtu/hr)
C-1151 C-1152 C-1153 C-1154
C-1140 C-1141 C-1142 C-1111
C-1121
Inlet Gas
C2+ and C3+ Liquids
Ethane Recycle CO2 Recycle
Combustion Emissions
Residue Gas
Harmon Creek Cryo #2 (260 MMSCFD)
037 Cryo Plant 2 Regen Heater (17.84 MMBtu/hr)
C-2151 C-2152 C-2153 C-2140 C-2141 C-2142
C-2111 C-2121
Inlet Gas
C2+ and C3+ Liquids
Ethane Recycle CO2 Recycle
Combustion Emissions
C-0501
C-1155 C-1156 C-1157
Harmon Creek DeEthanizer #1
033 DeEthanizer #1 HMO Heater 1 (48.15 MMBtu/hr)
034 DeEthanizer HMO Heater 2 (48.15 MMBtu/hr)
035 DeEthanizer Regen Heater (6.60 MMBtu/hr)
Purity Ethane
Ethane Pipeline
C3+ Product
NGL Pipeline
C-1179
Residue Gas
Ethane Recycle CO2 Recycle
Combustion Emissions
Three (3) Centrifugals
CO2 Recip Compressor
Combustion Emissions
Three (3) Screw Compressors
Inlet Gas
HP Inlets
Slug Catchers
Condensate
Stabilizer Overheads
Heater Combustion Emissions
Harmon Creek Cryo #3 (330 MMSCFD)
038 Cryo Plant 3 Regen Heater (21.75 MMBtu/hr)
C2+ and C3+ Liquids
Harmon Creek DeEthanizer #2
039 DeEthanizer #2 HMO Heater 1 (73.85 MMBtu/hr)
040 DeEthanizer #2 HMO Heater 2 (73.85 MMBtu/hr)
Purity Ethane
Ethane Pipeline
C3+ Product
NGL Pipeline
Harmon Creek Stabilizer #1
036 Stabilization HMO Heater (11.99 MMBtu/hr)
C-1191 C-1192
Centrifugal
Three (3) Screw Compressors
Stabilizer Bottoms
Process Drains
Centrifugal
Amine Process Drains
Amine Closed Drain
Closed Drain
Truck Loadout
Loadout Venting
C601 Plant Flare (126.52 MMscf/yr)
Venting Emissions
Tank Emissions
Measurement Devices
Methanol Tanks
Combustion Emissions
102 Two (2) Emergency Generators (49 & 279 bhp)
Rod Packing and Dry Seal Emissions
601 Compressor Venting
Fugitives to Atmosphere
Fugitives to Flare
701 Fugitive Emissions
Pigging Emissions To Flare
801 Pigging Launchers/ Receivers
*This process flow diagram serves to provide a high-level understanding of the facility processes and air emission sources. The actual facility design may vary.
Legend
= Proposed, New Source
= Existing, Modified Source
= Proposed, De Minimis Increase
= Existing, Unmodified Source
MarkWest Liberty M&R, L.L.C.
Harmon Creek Gas Plant
Process Flow Diagram
November 2024

Attachment 7

Closed Drain and Amine Closed Drain Tank
Emission Estimates

MarkWest Liberty Midstream & Resources, L.L.C.
Harmon Creek Gas Plant
Closed Drain Tank Estimates

Closed Drain Tank Emission Estimates

Closed Drain Tank Estimates

Emission Rate	12.67	(mmscf/yr)
Density	0.056	(lb/scf)
Total Emissions	707,074	(lb/yr)
Recovery Rate	98%	
Total Emissions	14,141	(lb/yr)

Pollutant	Mass %	Emissions tpy
VOC	23.89%	1.689
Methane	77.01%	5.445
Carbon Dioxide	0.21%	0.015
n-Hexane	0.19%	0.013
Benzene	0.030%	0.002
Toluene	0.053%	0.004
Ethylbenzene	0.030%	0.002
Xylene	0.010%	0.001
Total HAPs	0.41%	0.029

[1] The emission estimates provided under this section have been estimated using the best information available. The closed drain tank emissions are included in the facility-wide summary under the flare emissions.

[2] The emission rate was calculated using AP-42 Chapter 7 Section 7.1.3.1.1 Standing and Section 7.1.3.1.2 Working Losses

[3] The tank loss emissions assume inlet composition. Fractional compositions are not available for tank liquids.

[4] The tank volume is based on engineering calculations of 550 acf.

[5] The throughput is based on 300,000 gal/year, which is conservatively 3x the current actual.

MarkWest Liberty Midstream & Resources, L.L.C.
Harmon Creek Gas Plant
Amine Closed Drain Tank Estimates

Amine Closed Drain Tank Emission Estimates

<u>Amine Closed Drain Tank Estimates</u>

Emission Rate	0.83	(mmscf/yr)
Density	0.110	(lb/scf)
Total Emissions	91,348	(lb/yr)
Recovery Rate	98%	
Total Emissions	1,827	(lb/yr)

Pollutant	Mass %	Emissions tpy
VOC	0.04%	0.000
Methane	0.23%	0.002
Carbon Dioxide	88.98%	0.813
n-Hexane	0.00%	0.000
Benzene	0.000%	0.000
Toluene	0.00%	0.000
Ethylbenzene	0.00%	0.000
Xylene	0.00%	0.000
Total HAPs	0.00%	0.000

[1] The emission estimates provided under this section have been estimated using the best information available. The amine drain tank emissions are included in the facility-wide summary under the flare emissions based on the flare volume.

[2] The emission rate was calculated using AP-42 Chapter 7 Section 7.1.3.1.1 Standing and Section 7.1.3.1.2 Working Losses

[3] The tank loss emissions assume the composition with the highest HC content anticipated to be routed to the amine closed drain tank. Fractional compositions are not available for tank liquids.

[4] The tank volume is based on engineering calculations of 193 acf.

[5] The throughput is based on 10,080 gal/year, which is conservatively 3x the current actual with a 20% factor.

Submission Details

Details have been submitted successfully. Please review and print the Transaction Receipt for your records.

Reference : **273431**

Form Name : Air Quality Report or Miscellaneous Submission (no payment)

Submitter Name : Alexandra Juarez

Submitter Organization : MPLX

Submitter Email : ajuarez@marathonpetroleum.com

Phone Number : (412) 815-8886

Submitted To : Southwest Regional Office

Date Submitted : 11/26/2024

Print Confirmation