COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southeast Regional Office
October 13, 2023
484.250.5920

Subject: Technical Review Memo
RACT III Significant Modification to Title V Operating Permit No. 23-00119
APS ID 823642, Auth ID 1421251, PF ID 757998
Energy Transfer Marketing & Terminals, L.P.—Marcus Hook Terminal
100 Green Street
Marcus Hook, PA 19061

To: James D. Rebarchak
Environmental Program Manager
Air Quality Program
Southeast Region

From: David S. Smith
Engineering Specialist
Facilities Permitting Section
Air Quality Program

Through: Janine Tulloch-Reid, P.E.
Environmental Engineer Manager
Facilities Permitting Section
Air Quality Program

I. Introduction/Facility Description

Energy Transfer Marketing & Terminals, L.P. (ETMT), owns and operates the Marcus Hook Terminal (MHT), its petroleum terminal and natural gas liquids (NGLs) processing, storage, and distribution facility located in Marcus Hook Borough, Delaware County. The MHT is a major NO_x emitting facility[1] and a major VOC emitting facility[2,3] (see *RACT Analysis for NO_x and VOC Applicability* section, below, for further discussion) and is permitted under Title V Operating Permit (TVOP) No. 23-00119 and Plan Approval Nos. 23-0119E (revised) and 23-0119J.

On January 20, 2017, DEP issued a significant modification to the TVOP to establish Reasonably Available Control Technology (RACT) requirements and emission restrictions, pursuant to 25 Pa. Code §§ 129.96–129.100, for various sources at the MHT that commenced operation on or before July 20, 2012, to address the 1997 and 2008 8-hour ozone National Ambient Air Quality Standards (NAAQS) (hereinafter referred to as "RACT II").

On August 7, 2021, DEP proposed to adopt additional RACT requirements and/or emission restrictions at 25 Pa. Code §§ 129.111–129.115, for sources of NO_x emissions at a major NO_x emitting facility and/or sources of VOC

---

[1] As the term is defined in 25 Pa. Code § 121.1 (i.e., has a potential to emit nitrogen oxides [NO_x] of equal to or greater than 100 *tons/yr*, pursuant to subparagraph (vi)).

[2] As the term is defined in 25 Pa. Code § 121.1 (i.e., has a potential to emit volatile organic compounds (VOCs) of equal to or greater than 50 *tons/yr*, pursuant to subparagraph (v)).

[3] Accordingly, the facility is also a major facility, as the term is defined in 25 Pa. Code § 121.1 (i.e., has potentials to emit NO_x and VOCs of equal to or greater than 25 *tons/yr* each, pursuant to subparagraph (v)).

emissions at a major VOC emitting facility that commenced operation on or before August 3, 2018, to address the 2015 8-hour ozone NAAQS (hereinafter referred to as "RACT III"). On November 12, 2022, DEP published the final-form rulemaking in the *Pennsylvania Bulletin*.

Except for the West Warm Flare (Source ID C03), all sources at the MHT commenced operation on or before August 3, 2018, and are potentially subject to RACT III. In accordance with 25 Pa. Code §§ 129.111(a)(1)–(2) and (c), and 129.115(a)(1)(i), (a)(2)(i)–(ii), (a)(4), (a)(5)(i)–(iii), and (a)(7)(i)–(ii), on **December 13, 2022**, ETMT submitted an electronic notification to DEP with a listing of the sources at the MHT, a summary of the applicable RACT III requirements and emission restrictions, and its proposal for how it intends to comply with these (hereinafter referred to as "the RACT III proposal").

In the RACT III proposal, ETMT has specified whether each of these sources is exempt from 25 Pa. Code §§ 129.112–129.114, pursuant to 25 Pa. Code § 129.111(a) or (c); subject to presumptive RACT III requirements and/or emission restrictions, pursuant to 25 Pa. Code § 129.112; subject to alternative RACT III requirements and/or emission restrictions (i.e., case-by-case RACT III), pursuant to 25 Pa. Code § 129.114(b) or (c), or satisfy alternative RACT III requirements and/or emission restrictions by complying with existing RACT II requirements and/or emission restrictions (i.e., RACT II is RACT III), pursuant to 25 Pa. Code § 129.114(i)[4] (see *Attachment #2*; highlighting by DEP). In addition, ETMT has provided a source inventory (*Attachment #3*) with descriptions of each of these sources.

ETMT has indicated the following sources, which DEP has highlighted in *Attachment #2*, as subject to case-by-case RACT III, based on them not being subject to or evaluated under RACT II, not being exempt from RACT III or subject to presumptive RACT III requirements and/or emission restrictions, and each having a VOC potential to emit (PTE) equal to or greater than 2.7 *tons/yr*:

Source ID(s)	Source Name(s)	VOC PTE (*tons/yr*)	Basis
102 & 104–105	Refrigerated Propane Tank (500K BBL), Marine Vessel Loading (Refrigerated), Cavern	6.14	Projected Fugitive VOC Emissions Indicated in Application for Plan Approval No. 23-0119
103	NSPS Subpart VVa Fugitive Equipment Leaks	82.35	Projected Fugitive VOC Emissions Indicated in Applications for Plan Approval Nos. 23-0119, 23-0119A, 23-0119B, 23-0119D, 23-0119E (original), & 23-0119J
106A	Demethanizer	3.04	Projected Fugitive VOC Emissions Indicated in Application for Plan Approval No. 23-0119A
111	Natural Gasoline Loading Rack	5.06	Projected Fugitive VOC Emissions Indicated in Application for Plan Approval No. 23-0119B
112	New Cooling Towers	14.72	Projected Fugitive VOC Emissions Indicated in Applications for Plan Approval Nos. 23-0119C & 23-0119D
119–120	Refrigerated Propane Tanks (900K & 589K BBL)	11.58	Projected Fugitive VOC Emissions Indicated in Application for Plan Approval No. 23-0119D

[4] DEP has previously analyzed the RACT III proposal for the sources that ETMT has indicated satisfy RACT II is RACT III, and has determined that the RACT II requirements satisfy the RACT III requirements (see DEP's technical review memo, dated August 25, 2023 [*Attachment #1*]).

Therefore, ETMT has proposed alternative VOC RACT III requirements and emission restrictions for these sources, in accordance with 25 Pa. Code § 129.114(c) (see *Case-by-Case RACT III Analysis* section, below, for further discussion).

To this end, on **December 20, 2022**, ETMT submitted an electronic significant TVOP modification application package, including a RACT III alternative compliance plan, to DEP. The significant TVOP modification application package included the significant TVOP modification application,[5] compliance review form [25 Pa. Code § 127.412],[6] and copies of and proof of delivery for the notifications to the municipality and county[7] [71 P.S. § 510-5 (Act 14 of 1984); 25 Pa. Code § 127.413]. On December 22, 2022, DEP received monies of $4,000 for the significant TVOP modification application fee [25 Pa. Code § 127.704(b)(4)(ii)].) All applicable sections of the significant TVOP modification application were completed. Therefore, DEP considers the significant TVOP modification application administratively complete [25 Pa. Code § 127.421(a)] as of the latter date.

On October 4, 2023, ETMT submitted an electronic addendum to the significant TVOP modification application (*Attachment #4*) to supersede the case-by-case RACT III analysis for the refrigerated propane storage tanks (Source IDs 102 and 119–120) at the MHT.

II. RACT III Analysis for NO_x and VOC Applicability

The TVOP includes NO_x and/or VOC emission restrictions (i.e., PTEs) for the following sources at the MHT:

Source ID(s)	Source Name	NO_x PTEs (*tons/yr*)	VOC PTEs (*tons/yr*)
031 and 033–034	Auxiliary Boilers 1 and 3–4 (respectively)	92.71	5.49
112	New Cooling Towers		14.71
113	Diesel Engine Pumps (6)	23.79	0.91
132	Tank 242		7.25
139	Existing Cooling Towers		4.60
188	Tank 607		6.75
190	Tank 609		5.40
192	Tank 611		6.05
204, 212, and 225	Tanks 253, 610, and 638 (respectively)		40.40
357–358	Tanks 357–358 (respectively)		17.22
404	NSPS IIII Emergency Generator	6.40	
405	NSPS IIII Fire Pumps (4)	6.6	
701	Wastewater Treatment System		0.90
	Totals	129.50	109.68

In addition, as stated in ETMT's most recent Firm/Plant Report for the MHT, the actual NO_x and VOC emissions from the MHT for calendar year 2022 are 58.50 *tons/yr* and 164.82 *tons/yr*,[8] respectively.

[5] ETMT did not assert any confidential information in its significant TVOP modification application.

[6] The compliance review form is dated December 14, 2023, and is the most recent version submitted by ETMT. The *Compliance Background* section of the form is missing several entries and is no longer up to date. Therefore, DEP has included an updated listing of notices of violation (NOVs) and associated penalties as *Appendix A* at the end of this technical review memo. Included in the updated listing are violations noted during DEP's most recent full compliance evaluation for the MHT, performed on September 12 & 14, 2023.

[7] The municipality and county received notification of ETMT's submittal of the significant TVOP modification application on December 19, 2022.

[8] The actual emissions of VOCs from the MHT exceed the total VOC PTE because many of the sources at the MHT are sources of fugitive VOC emissions, for which PTEs have not been established.

III. Major NO_x Emitting Facility and Major VOC Emitting Facility Status

Based on the above NO_x and VOC PTEs for and actual emissions of VOCs from the MHT, the MHT is both a major NO_x emitting facility and a major VOC emitting facility. Accordingly, ETMT has submitted the aforementioned RACT III proposal. DEP concurs with this facility status.

IV. Regulatory Analysis

The MHT is subject to the following federal regulations:

- New Source Performance Standards (NSPS) [40 CFR Part 60]: Subparts Db, Kb, VV, VVa, EEEE, and IIII.
- Maximum Achievable Control Technology (MACT) standards [40 CFR Part 63]: Subparts R, Y, ZZZZ, and DDDDD.
- Prevention of Significant Deterioration of Air Quality (PSD) [Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.), Title I, Part C; 40 CFR § 52.21]: For the aggregation of all past and future authorizations for sources and equipment related to the NGLs processing, storage, and distribution operations at the MHT as a single aggregated project.[9]
- Nonattainment New Source Review (NSR) [CAA, Title I, Part D]: For several past authorizations at the MHT,[10] and also for the aggregation of all past and future authorizations for sources and equipment related to the NGLs processing, storage, and distribution operations at the MHT as a single aggregated project.

V. Summary of RACT III Requirements for Each Source

As discussed in the *Introduction/Facility Description* section, above, ETMT has specified in *Attachment #2* which sources at the MHT are exempt from RACT III (not highlighted by DEP), are subject to presumptive RACT III requirements and/or emission restrictions (as highlighted by DEP), are subject to case-by-case RACT III (as highlighted by DEP), or satisfy RACT II is RACT III (as highlighted by DEP). These sources are listed in *Attachment #2*, as follows:

- Table A-1: RACT III applicability for NO_x-emitting sources (includes all types except case-by-case).
- Table A-2: RACT III applicability for VOC-emitting sources (includes all types).
- Table A-3: Sources exempt from RACT III.

DEP concurs with ETMT's classification of the sources at the MHT, except that, during an October 12, 2023, telephone conversation with DEP, Kevin Smith, Senior Specialist – Environmental Compliance, ETMT confirmed that the modification to the deethanizer originally authorized under Plan Approval No. 23-0119A to a demethanizer (Source ID 106 → 106A) occurred in October 2019, with the source commencing operation as a demethanizer in November 2019. Since the modified demethanizer commenced operation after August 3, 2018, it is exempt from RACT III. Therefore, DEP has ~~struck through~~ the listing of the demethanizer and will disregard the case-by-case RACT III analysis for the demethanizer that ETMT included in its RACT III alternative compliance plan.

[9] The MHT first became subject to PSD requirements under Plan Approval No. 23-0119K, which is currently pending.

[10] The MHT first became subject to NSR requirements under Plan Approval No. 23-0119B, originally issued on January 30, 2014.

VI. Case-by-Case RACT III Analysis

In its RACT III alternative compliance plan, ETMT has conducted a "top-down" analysis,[11] where applicable, as outlined in the United States Environmental Protection Agency's (EPA's) *Draft New Source Review Workshop Manual*, dated October 1990, for each source subject to case-by-case RACT III to satisfy the following five-step RACT analysis process indicated in 25 Pa. Code § 129.92(b):

- Step 1: Identify all available control options (i.e., air cleaning devices, air pollution control technologies, or techniques).
- Step 2: Evaluate the technical feasibility of the available control options and eliminate any that are technically infeasible.
- Step 3: Rank all technically feasible control options (i.e., those not eliminated in Step 2) by control effectiveness.
- Step 4: Evaluate the cost effectiveness of the technically feasible control options and eliminate any that are not cost effective.
- Step 5: Select RACT (i.e., the highest-ranking control option from Step 3 that was not eliminated in Step 4).

A. Refrigerated Propane Storage Tanks (Source IDs 102 and 119–120)

The refrigerated propane storage tanks store processed and chilled (liquid) propane prior to shipping offsite via marine tank vessels. Each of the storage tanks is equipped with a boil-off gas (BOG) management system to collect evaporated propane vapors that slowly arise within the storage tanks due to heat infiltration, compress and condense them, and route the re-liquified propane back to the respective storage tank (via hard piping). Fugitive VOC emissions from the piping components are reduced through good operating practices, including the use of a leak detection and repair (LDAR) program (see Sub-section B. [*NSPS Subpart VVa Fugitive Emission Leaks*] within this section, below, for further discussion).

The storage tanks and BOG management systems also include operational, maintenance, and emergency connections to one of two existing elevated cold flares (Source IDs C01–C02) at the MHT to minimize collected VOC emissions. Operational and maintenance flows from the storage tanks are part of normal operations to prevent atmospheric releases and/or control process vessel pressure during abnormal high pressure. The cold flares also serve to control any releases of process gases from the storage tanks during emergency situations.

The BOG management systems and flares satisfy the requirement specified in 40 CFR § 60.112b(b)(1) to equip "each storage vessel with a design capacity greater than or equal to 75 m^3 which contains a [volatile organic liquid] that, as stored, has a maximum true vapor pressure greater than or equal to 76.6 *kPa*[12]" with a "closed vent system … designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 *ppm* above background and visual inspections," and a "control device … designed and operated to reduce inlet VOC emissions by 95 percent or greater."

1. Step 1: Based on its review of entries in EPA's RACT/BACT/Lowest Achievable Emissions Rate (LAER) Clearinghouse (RBLC), ETMT has determined that flares and thermal oxidizers are the only two available control options to satisfy the control device requirement specified in 40 CFR § 60.112b(b)(1).

[11] The "top-down" analysis conducted by ETMT follows the format of the Best Available Control Technology (BACT) analysis required for pollutants subject to PSD requirements. As BACT is more stringent than RACT, DEP consents to this approach. The BACT analysis process involves the same five steps, except that Step 4 includes consideration of the energy, environmental, and economic impacts.

[12] The capacities of the refrigerated propane storage tanks range between approximately 79,500–143,000 m^3, and the vapor pressure of propane at the actual storage temperature of –45 °*F* is approximately 108 *kPa*.

A flare is essentially a torch fueled by process exhaust. A flare requires the exhaust to contain enough VOCs so that it will combust upon contact with the pilot flame, to which the exhaust stream is hard piped. The VOCs present in the exhaust stream are, thus, destroyed before exhausting into the outdoor atmosphere. More detailed information on flares can be found in EPA's associated Air Pollution Control Technology Fact Sheet (EPA-452/F-03-019; *Attachment #5*).

A thermal oxidizer destroys VOCs in exhausted process air by heating the air to a high temperature. The mostly VOC-free air is ultimately exhausted into the outdoor atmosphere. More detailed information on thermal oxidizers can be found in EPA's associated Air Pollution Control Technology Fact Sheet (EPA-452/F-03-022; *Attachment #6*).

2. Step 2: As indicated in the "Typical Industrial Applications" sections of Attachment #s 5–6, flares are the only control option suitable for handling the large fluctuations in process gas flows between normal operations and emergency situations. Therefore, a thermal oxidizer is technically infeasible. Since flares are the only technically feasible control option and the refrigerated propane storage tanks already use two existing elevated cold flares, ETMT has skipped Steps 3–4.

3. Step 5: ETMT has proposed to continue the use of the existing BOG management systems and elevated cold flares as RACT. To this end, ETMT has proposed to continue operating the BOG management systems and elevated cold flares to comply with the provisions of 40 CFR §§ 60.112b and 60.18, respectively. These requirements are specified in Condition # 006, Section D (under Source IDs 102 and 119–120), of the previously-modified (i.e., current) TVOP, and Condition #s 001, 003, and 006–007, Section D (under Source IDs C01 and C02), of the previously-modified TVOP, respectively.

B. NSPS Subpart VVa Fugitive Equipment Leaks (Source ID 103)

This source grouping addresses NSPS, Subpart VVa, requirements for fugitive VOC equipment leaks, including good operating practices and periodic monitoring under an LDAR program, for the sources at the MHT indicated in Condition # 025, Section D (under Source ID 103), of the proposed modified TVOP.[13]

1. Step 1: Based on its review of entries in EPA's RBLC, ETMT has determined that good operating practices and the LDAR program are the only available control options for reducing fugitive VOC emissions from equipment leaks. Therefore, ETMT has skipped Steps 2–4.

2. Step 5: ETMT has proposed to continue the use of good operating practices and the LDAR program as RACT. To this end, ETMT has proposed to continue conducting LDAR monitoring in accordance with the requirements of NSPS, Subpart VVa, and following good operating practices for fugitive VOC equipment leaks in compliance with Condition #s 009–011 and 013, Section D (under Source ID 103), of the previously-modified TVOP.

C. Marine Vessel Loading (Refrigerated) (Source ID 104)

Refrigerated (liquid) ethane, propane, and butane are loaded onto marine tank vessels via loading arms at Docks 1A, 2A, and 3C at the MHT for shipment offsite. Vapors that are released during the loading of marine tank vessels, from both the transfer of liquid products from any of the refrigerated storage tanks (i.e., BOG) and the displacement of the vapor space in the cargo tanks on the marine tank vessels, are collected and recovered either by marine vapor recovery (MVR) systems installed on the respective marine tank vessels, when available, or, otherwise, by vapor balancing systems using the vapor return lines on the MVR skids at the respective docks.

[13] The listing of sources in the proposed modified TVOP includes the following sources that were not listed in the previously-modified TVOP: Source IDs 090–092, 124–125, 142, and C04 (see *Additional Information* section, below, for further discussion); as well as process gas vessel V282 of the 15-2B gas plant unit and all associated piping and fugitive emissions components, including the gas chromatography shelter, leading to the auxiliary boilers.

In either case, the vapors are collected, compressed, and condensed for recovery as product. Whereas the MVR systems route the re-liquified product to the cargo tanks on the respective marine tank vessels, the vapor balancing systems route the re-liquified product to the BOG management systems of the respective refrigerated storage tanks. Upon completion of loading, the loading arms are purged with nitrogen to complete the transfer of liquid products into the cargo tanks on the marine tank vessels. Fugitive VOC emissions from the piping components are reduced through good operating practices, including the use of an LDAR program (see Sub-section B. [*NSPS Subpart VVa Fugitive Emission Leaks*], above, for further discussion).

1. Step 1: Based on its review of entries in EPA's RBLC, ETMT has determined that a vapor balancing system/MVR system and vapor combustion, in conjunction with good operating practices, are the only two available control options to reduce collected VOC emissions.

   As the term is defined in 40 CFR § 63.561, a vapor balancing system "is designed to collect … vapors displaced [from the vapor space in the cargo tanks on the marine tank vessels] … during marine tank vessel loading operations and … route the[m] … to the storage vessel from which the liquid [product] being loaded originated or to compress [the] collected … vapors and commingle with the raw feed of a process unit" (i.e., use as a fuel). Both recovery as a product and use as a fuel may include compression, while recovery as a product may also include an absorption or adsorption system.

   An MVR system is essentially the same as a vapor balancing system, except that it does not satisfy the portion of the above definition for the displaced vapors to be routed to the storage tank from which the liquid product being loaded originated.

   With vapor combustion (VC), the collected vapors are sent to a flare, thermal oxidizer, or combustor instead of being recovered as a product or used as a fuel.

2. Step 2: Both a vapor balancing system/MVR system and vapor combustion, in conjunction with good operating practices, are technically feasible.

3. Step 3: While ETMT has indicated that the vapor balancing system"/VR system and VC have similar effectiveness for controlling VOC emissions," it did not specify the control effectiveness of either control option, as required for both the BACT and RACT analysis processes, to substantiate this conclusion and rank the control options. However, based on the fact that marine tank vessel loading operations employing a vapor balancing system are exempt from the MACT and RACT provisions of 40 CFR Part 63, Subpart Y, DEP considers the vapor balancing system/MVR system, in conjunction with good operating practices, as being the most control effective. As such, Step 4 is not necessary.

4. Step 5: ETMT has proposed to continue the use of the existing vapor balancing system/MVR system as RACT. To this end, ETMT has proposed to continue operating the vapor balancing system/MVR system in compliance with Condition #s 004–005, Section D (under Source ID 104), of the previously-modified TVOP.

D. Cavern (Source ID 105)

The MHT has four underground caverns that store liquid butane (#s 1–3) and propane (#5) under pressure. The caverns are equipped with pressure relief valves, as well as some hard piping and fugitive emissions components. Fugitive VOC emissions generated from the piping components are reduced through good operating practices, including the use of an LDAR program (see Sub-section B. [*NSPS Subpart VVa Fugitive Emission Leaks*] within this section, above, for further discussion).

1. Step 1: Based on its review of entries in EPA's RBLC, ETMT has determined that there are no available control options for the caverns. Therefore, ETMT has skipped Steps 2–4.

2. Step 5: ETMT has proposed to continue the use of the LDAR program as RACT (see Sub-section B. [*NSPS Subpart VVa Fugitive Emission Leaks*] within this section, above, for further discussion).

E. Natural Gasoline Loading Rack (Source ID 111)

The 4-bay natural gasoline loading rack is used for the offloading of natural gasoline feedstock from tanker trucks into any of four internal floating roof (IFR) storage tanks, as well and the loading of pentane into tanker trucks from three spheres. Vapors that are released during the offloading and loading operations, from both the transfer of liquid products and the displacement of vapor space in the tanker trucks, IFR storage tanks, and spheres, are collected, compressed, condensed, and routed to the IFR storage tanks or spheres, as applicable, by a vapor balancing system (Source ID C115).

The hoses used to connect the tanker trucks to the natural gasoline loading rack include dry disconnect couplings, which feature an automatic mechanism to seal off both ends of the line upon disconnection. Fugitive VOC emissions from the piping components are reduced through good operating practices, including the use of an LDAR program (see Sub-section B. [*NSPS Subpart VVa Fugitive Emission Leaks*], above, for further discussion).

1. Step 1: Based on its review of entries in EPA's RBLC, ETMT has determined that a vapor balancing system and vapor combustion, in conjunction with good operating practices, are the only two available control options to reduce collected VOC emissions.
2. Step 2: Both a vapor balancing system and vapor combustion, in conjunction with good operating practices, are technically feasible.
3. Step 3: As with the marine vessel loading (refrigerated), DEP considers the vapor balancing system, in conjunction with good operating practices, as being the most control effective. As such, Step 4 is not necessary.
4. Step 5: ETMT has proposed to continue the use of the existing vapor balancing system and good operating practices as RACT. To this end, ETMT has proposed to continue operating the natural gasoline loading rack in compliance with Condition #s 004–006, Section D (under Source ID 111), of the previously-modified TVOP.

F. New Cooling Towers (Source ID 112)

The two cooling towers provide 80,000 *gal/min* of non-contact cooling water to cool liquid hydrocarbons associated with various petroleum handling/processing units at the MHT. The cooling water is continuously recirculated through the cooling towers and petroleum handling/processing units, as follows:

- Cooled water from the basins of the cooling towers is pumped through several non-contact process heat exchangers, increasing the temperature of the water.
- The warmer water is distributed over the tops the cooling towers and cascades down through the cooling tower cells.
- Fans direct air up through the cooling tower cells and past the water. This results in the evaporation of a portion of the water, which serves to cool the remaining water.
- The cooled water collects in the basins of the cooling towers to complete the loop. Make-up water is periodically added to the basins of the cooling towers to maintain sufficient water levels and cooling capacities.

Over time, leaks can occur in the process heat exchangers, thereby allowing hydrocarbon liquids or gases to mix with the circulating non-contact cooling water. Fugitive VOC emissions generated in this manner are reduced through the use of a heat exchanger LDAR program.

1. Step 1: Based on its review of entries in EPA's RBLC, ETMT has determined that good operating practices, including non-contact design and a heat exchanger LDAR program, are the only available control option for the cooling towers. Therefore, ETMT has skipped Steps 2–4.

2. Step 5: ETMT has proposed to continue the use of good operating practices as RACT. To this end, ETMT has proposed to continue operating the vapor balancing system/MVR system in compliance with Condition #s 010–013, Section D (under Source ID 112), of the previously-modified TVOP.

In accordance with 25 Pa. Code § 129.115(f), and as already required in the following conditions of the previously-modified TVOP, ETMT shall maintain records of all information necessary to determine compliance with all applicable requirements of 25 Pa. Code §§ 129.111 and 129.114:

- Refrigerated propane storage tanks: Condition #s 001–003, Section D (under Source IDs 102 and 119–120), of the previously-modified TVOP, and Condition # 004, Section D (under Source IDs C01 and C02), of the previously-modified TVOP.
- NSPS Subpart VVa fugitive equipment leaks: Condition #s 005–006, Section D (under Source ID 103), of the previously-modified TVOP.
- Marine vessel loading (refrigerated): Condition # 003, Section D (under Source ID 104), of the previously-modified TVOP.
- Cavern: Condition # 002, Section D (under Source ID 103), of the previously-modified TVOP.
- Natural gasoline loading rack: Condition # 003, Section D (under Source ID 111), of the previously-modified TVOP.
- New cooling towers: Condition #s 008–010, Section D (under Source ID 112), of the previously-modified TVOP.

Therefore, compliance with the above TVOP conditions assures compliance with case-by-case RACT III,[14] and there are no changes to the TVOP conditions (or condition numbers). DEP has added additional authority citations to 25 Pa. Code §§ 129.111–129.115 to each of the above TVOP conditions.[15]

VII. Additional Information

As part of the significant modification to the TVOP, DEP has incorporated Plan Approval Nos. 23-0119E (revised) and 23-0119J by reference. In addition to including in the TVOP all applicable requirements for the sources reflected in the Plan Approvals, DEP has also included in the TVOP the following sources, which were inadvertently omitted from the Plan Approvals:

- Plan Approval No. 23-0119E (revised): Two depropanizers and a debutanizer (Source IDs 090–091 and 092, respectively).
- Plan Approval No. 23-0119J: Two Project Phoenix demethanizers (Source ID 142).

However, the only requirements for these sources are those specified under Source ID 103 for fugitive VOC equipment leaks. During an October 10, 2023, telephone conversation with DEP, Kevin Smith of ETMT confirmed that Source IDs 091–092 are the only omitted sources that have commenced operation,[16] and they have always been monitored as part of ETMT's LDAR program. Therefore, the prior omission of these sources from the Plan Approvals was inconsequential.

[14] This statement notwithstanding, under pending Plan Approval No. 23-0119K, DEP has proposed changes to ETMT's LDAR program to meet LAER.

[15] DEP has also added additional authority citations to 25 Pa. Code § 129.114(i) to those conditions associated with the sources for which RACT II is RACT III.

[16] ETMT has yet to commence physical construction of Source IDs 090 and 142, let alone commence operation.

In addition, DEP has added language to the requirement to conduct an annual performance tune-up of the auxiliary boilers, as indicated in Condition # 022, Section E (under Source Group 0), of the previously-modified TVOP (same condition in the modified TVOP), to clarify that they be performed "no more than 13 months after the date of the previous tune-up."

Lastly, DEP has added a permit map to the TVOP for marine vessel loading (refrigerated) to reflect the fact that the piping components of the MVR system are sources of fugitive VOC emissions.

VIII. Public Hearing

On November 14, 2023, DEP will hold a public hearing at the Marcus Hook Municipal Building, 1111 Market Street, Marcus Hook, PA 19061, to accept oral and written testimony on the proposed RACT III alternative compliance plan action and the proposed revision to the Commonwealth's State Implementation Plan (SIP).

IX. Comment and Response

[TBD]

X. Conclusion

Based on a review of the RACT III proposal and significant TVOP modification application with RACT III alternative compliance plan, I recommend that DEP modify TVOP No. 23-00119 for ETMT for its MHT located in Marcus Hook Borough, Delaware County.

Appendix A: ETMT MHT Compliance History

NOV Date	Violation Description	CACP/Settlement Date	Penalty Amount
6/7/2016	25 Pa. Code Section 127.444: Exceedances of VOC TVOP limits for three storage tanks.	Not referred for enforcement action as PA DEP AQ agreed to increase limits via plan approval.	
6/8/2017	25 Pa. Code Section 127.444: Failure to conduct and record weekly inspections of loading rack hoses and fittings; failure to conduct 2016 EPA M21 inspection of the wastewater separator’s fixed roof components; failure to monitor valve monthly until a leak is not detected for two consecutive months, which is also a violation of NSPS Subpart VVa, §60.482a(c)(2).	3/15/2019	$110,000.00 combined settlement
4/6/2018	25 Pa. Code Sections 121.7 and 127.444: On January 12, 2018 a blinded future connection valve gasket failed on 5 Cavern wet meter skid causing release of 1.20 tons of propane to outdoor atmosphere.	3/27/2020	$304,700.00 combined settlement
7/10/2018	25 Pa. Code Section 127.444: Failure to perform initial monitoring of valves and pumps in gas/vapor and light liquid service per 40 CFR Part 60, Subpart VVa requirements.	3/15/2019	$110,000.00 combined settlement
3/18/2019	25 Pa. Code Section 121.7, 123.1, 127.444: 11/23/2018 89 ton VOC release; 1/21- 22/2019 510 ton release; 2/4/2019 18 ton VOC release. 40 CFR Section 60.482-4a(2): Failure to monitor 11/23/2018 PSV lift within 5 calendar days following lift.	3/27/2020	$304,700.00 combined settlement
5/6/2019	25 Pa. Code Section 127.444: Failure to conduct weekly inspections of loading rack equipment.	3/27/2020	$304,700.00 combined settlement
3/3/2020	25 Pa. Code Section 127.462(b): No application for a minor permit modification was submitted to DEP prior to converting a Deethanizer to a Demethanizer.	11/4/2021	$301,105.00 combined settlement
3/19/2020	25 Pa. Code Section 127.444: Failure to conduct weekly inspections of loading rack equipment; oily water in conveyance system; failure to change carbon canisters w/in 24 hours of benzene breakthrough. 40 CFR Part 63 Subpart 4Z violations. 25 Pa. Code Chapter 135 violations for failure to report significant VOC emissions from truck connection venting practices.	11/4/2021	$301,105.00 combined settlement
12/14/2020	25 Pa. Code Section 127.444 and 40 CFR Part 60 Subpart VVa: Failure to conduct monthly EPA M21 monitoring and weekly visual inspections on pumps, and monthly EPA M21 monitoring on valves in C5 Splitter LDAR Unit for over 1 year; failure to conduct monthly EPA M21 monitoring on 4 pumps in ME 2 LDAR Unit during Nov 2019.	11/4/2021	$301,105.00 combined settlement

2/4/2021	25 Pa. Code Section 127.444, 40 CFR Part 60 Subpart VV and Subpart A: Failure to conduct EPA M21 monitoring on 19 valves associated with flare in 15-2S LDAR Unit from 2012 through 1/29/2021; On August 7, 2020, all four pilots of the West Cold Flare were out for 5 hours, and on December 16, 2020, all three pilots of the East Cold Flare were out for 40 minutes.	11/4/2021	$301,105.00 combined settlement
2/24/2021	25 Pa. Code Sections 121.7, 123.1 and 127.444: February 12, 2021 butane release (1,091 lbs (224 gallons)) on the 1 Cavern inlet line due to a crack in the welded connection of a check valve	11/4/2021	$301,105.00 combined settlement
8/4/2021	25 Pa. Code Sections 121.7, 123.1 and 127.444: June 8, 2021 propane trailer PSV lift and failure to reseat causing estimated 1.42 tons of propane, a volatile organic compound (VOC), release to outdoor atmosphere.	9/13/2022	$119,475.00 combined settlement
10/5/2021	25 Pa. Code Section 127.444, 40 CFR Part 60 Subparts VV and VVa: Failure to monitor numerous valves and pumps per regulatory requirements. Failure to consistently monitor leaking valves for two consecutive months following repair. Two open-ended lines not equipped with cap, plug or blind-flange.	9/13/2022	$119,475.00 combined settlement
2/22/2022	25 Pa. Code Sections 127.444, 40 CFR Part 60 Subparts VV and VVa: Failure to monitor numerous valves per regulatory requirements. Two open-ended lines not equipped with a cap, plug or blind-flange.	9/13/2022	$119,475.00 combined settlement
1/9/2023	25 Pa. Code Sections 121.7, 123.1 and 127.444: Review of January 5, 2023 incident report from December 30, 2022 gasoline spill in H5 manifold area of the facility on a slip-blinded flange on the Gasoline Blending Line. Happened in containment. 146 barrels gasoline vaporized: 15.44 tons VOC vaporized (6.14 tons of butane and 9.3 tons pentane), and 259 barrels recovered via vac truck.	Violation Referred for Enforcement	
2/16/2023	25 Pa. Code Section 127.444, 40 CFR Part 60 Subparts VV and VVa: Missed 207 and 2,587 monitoring events under 40 CFR Part 60 Subparts VV and VVa, respectively.	9/12/2023	$234,696
8/17/2023	25 Pa. Code Sections 127.25 and 127.444, 40 CFR Part 63 Subpart DDDDD: Failure to perform annual tune-up on Auxiliary Boiler 1 no more than 13 months after the previous tune-up. During 2022 and 2023, Auxiliary Boiler 1 tune-ups were performed on May 10, 2022 and August 8, 2023.	Violation Not Resolved	
9/29/2023	1) 40 CFR Part 60, Appendix A-7, EPA M21: No record of a calibration precision test for analyzer for Q2 2020 prior to quarterly EPA M21 monitoring. 2) 25 Pa. Code Section 127.444, 40 CFR Part 60 Subpart VVa: No record of a calibration precision test for analyzer required by EPA M21. 3) 25 Pa. Code Sections 123.1 and 127.444: On September 12, 2023, an open 5-gallon bucket of crude oil left unattended next to Tank 352.	Violation Not Resolved	

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Southeast Regional Office
August 25, 2023
484.250.5920

Subject: Technical Review Memo
RACT II is RACT III Case-By-Case Analysis for Title V Operating Permit No. 23-00119
APS ID 1056774, PF ID 757998
Energy Transfer Marketing & Terminals, L.P.—Marcus Hook Terminal
100 Green Street
Marcus Hook, PA 19061

To: James D. Rebarchak 9/12/2023
Regional Air Quality Program Manager
Air Quality Program
Southeast Region

From: David S. Smith DSS 8/25/23, 9/5/2023
Engineering Specialist
Facilities Permitting Section
Air Quality Program

Through: Janine Tulloch-Reid, P.E. JET 9/6/2023
Environmental Engineer Manager
Facilities Permitting Section
Air Quality Program

I. Procedural History

As part of the Reasonably Available Control Technology (RACT) regulations codified at 25 Pa. Code §§ 129.111—129.115 (relating to additional RACT requirements for major sources of NO_x and VOCs for the 2015 ozone NAAQS) (hereinafter referred to as "RACT III"), the Pennsylvania Department of Environmental Protection (DEP) has established a method under 25 Pa. Code § 129.114(i) (relating to alternative RACT proposal and petition for alternative compliance schedule) for an applicant to demonstrate that the alternative RACT compliance requirements incorporated under 25 Pa. Code § 129.99 (relating to alternative RACT proposal and petition for alternative compliance schedule) (hereinafter referred to as "RACT II") for a source that commenced operation on or before October 24, 2016, and which remain in force in the applicable operating permit continue to be RACT under RACT III as long as no modifications or changes were made to the source after October 24, 2016. The date of October 24, 2016, is the date specified in 25 Pa. Code § 129.99(i)(1) by which written RACT proposals to address the 1997 and 2008 8-hour ozone National Ambient Air Quality Standards (NAAQS) were due to DEP from the owner or operator of an air contamination source located at a major NO_x emitting facility[1] or a major VOC emitting facility[2] subject to 25 Pa. Code § 129.96(a) or (b) (relating to applicability).

The procedures to demonstrate that RACT II is RACT III are specified in 25 Pa. Code § 129.114(i)(1)(i)–(ii) and (i)(2). An applicant may submit an analysis, certified by the responsible official, that the RACT II permit

[1] As the term is defined in 25 Pa. Code § 121.1 (i.e., has a potential to emit nitrogen oxides [NO_x] of equal to or greater than 100 *tons/yr*, pursuant to subparagraph (vi)).

[2] As the term is defined in 25 Pa. Code § 121.1 (i.e., has a potential to emit volatile organic compounds (VOCs) of equal to or greater than 50 *tons/yr*, pursuant to subparagraph (v)).

Attachment #1

requirements remain RACT for RACT III by following the procedures established in 25 Pa. Code § 129.114(i)(1)–(2).

25 Pa. Code § 129.114(i)(1) establishes cost effectiveness thresholds of $7,500 per ton of NO_x emissions reduced and $12,000 per ton of VOC emissions reduced as ''screening level values'' to determine the amount of analysis and due diligence that the applicant shall perform if there is no new pollutant specific air cleaning device, air pollution control technology or technique available at the time of submittal of the analysis.

25 Pa. Code § 129.114(i)(1)(i) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology, or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology, or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by DEP under 25 Pa. Code § 129.99(e) had a cost effectiveness equal to or greater than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology, or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies, or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology, or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology, or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains equal to or greater than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced.

25 Pa. Code § 129.114(i)(1)(ii) specifies that the applicant that evaluates and determines that there is no new pollutant specific air cleaning device, air pollution control technology, or technique available at the time of submittal of the analysis and that each technically feasible air cleaning device, air pollution control technology, or technique evaluated for the alternative RACT requirement or RACT emission limitation approved by DEP under 25 Pa. Code § 129.99(e) had a cost effectiveness less than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced shall include the following information in the analysis:

- A statement that explains how the owner or operator determined that there is no new pollutant specific air cleaning device, air pollution control technology, or technique available.
- A list of the technically feasible air cleaning devices, air pollution control technologies, or techniques previously evaluated under RACT II.
- A summary of the economic feasibility analysis performed for each technically feasible air cleaning device, air pollution control technology, or technique in the previous bullet and the cost effectiveness of each technically feasible air cleaning device, air pollution control technology, or technique as submitted previously under RACT II.
- A statement that an evaluation of each economic feasibility analysis summarized in the previous bullet demonstrates that the cost effectiveness remains less than $7,500 per ton of NO_x emissions reduced or $12,000 per ton of VOC emissions reduced.
- A new economic feasibility analysis for each technically feasible air cleaning device, air pollution control technology, or technique.

25 Pa. Code § 129.114(i)(2) establishes the procedures that the applicant that evaluates and determines that there is a new or upgraded pollutant specific air cleaning device, air pollution control technology, or technique available at the time of submittal of the analysis shall follow.

- Perform a technical feasibility analysis and an economic feasibility analysis in accordance with 25 Pa. Code § 129.92(b) (relating to RACT proposal requirements).
- Submit that analysis to DEP for review and approval.

The applicant shall also provide additional information requested by DEP that may be necessary for the evaluation of the analysis submitted under 25 Pa. Code § 129.114(i).

II. Facility Details

Energy Transfer Marketing & Terminals, L.P. (ETMT), owns and operates the Marcus Hook Terminal (MHT), its petroleum terminal and natural gas liquids (NGLs) processing, storage, and distribution facility located in Marcus Hook Borough, Delaware County.

The MHT is a major NO_x emitting facility and a major VOC emitting facility[3] and is permitted under Title V Operating Permit (TVOP) No. 23-00119 and Plan Approval Nos. 23-0119E (revised) and 23-0119J. On January 20, 2017, DEP issued a significant modification of TVOP No. 23-00119 to establish RACT II requirements and emission restrictions for various sources at the facility, including alternative RACT II requirements and emission restrictions pursuant to 25 Pa. Code § 129.99 (see the associated revised DEP technical review memo, dated October 16, 2017 [*Attachment #1*]).

On **October 19, 2020**, the United States Environmental Protection Agency (EPA) approved DEP's RACT II determination for Sunoco Partners Marketing & Terminals, L.P. (SPMT) for its Marcus Hook Industrial Complex (MHIC)[4] as a revision to the Commonwealth of Pennsylvania's State Implementation Plan. This approval is listed in the *Federal Register* at **85 FR 66263**, which can be accessed along with all EPA-approved RACT requirements for the Commonwealth of Pennsylvania, via the following link: https://www.epa.gov/sips-pa/epa-approved-pennsylvania-source-specific-requirements.

Except for the West Warm Flare (Source ID C03) at the facility, all sources at the MHT commenced operation on or before August 3, 2018, and are potentially subject to RACT III requirements of 25 Pa. Code §§ 129.111–129.115. In accordance with 25 Pa. Code §§ 129.111(a)(1)–(2) and (c), and 129.115(a)(1)(i), (a)(2)(i)–(ii), (a)(4), (a)(5)(i)–(iii), and (a)(7)(i)–(ii), on **December 13, 2022**, ETMT submitted a notification to DEP with a listing of the sources at the MHT, a summary of the applicable RACT III requirements and emission restrictions, and its proposal for how it intends to comply with these (hereinafter referred to as "the RACT III proposal").

In the RACT III proposal, ETMT has specified whether each of these sources is either subject to presumptive RACT III requirements and/or emission restrictions pursuant to 25 Pa. Code § 129.112; subject to alternative RACT III requirements and/or emission restrictions pursuant to 25 Pa. Code § 129.114; or exempt from 25 Pa. Code §§ 129.112–129.114 pursuant to 25 Pa. Code § 129.111(a) or (c). Moreover, ETMT has provided a source inventory with descriptions of each of these sources (see *Attachment #2*).

---

[3] Accordingly, the facility is also a major facility, as the term is defined in 25 Pa. Code § 121.1 (i.e., has potentials to emit NO_x and VOCs of equal to or greater than 25 *tons/yr* each, pursuant to subparagraph (v)).

[4] On March 1, 2022, SPMT changed its company name to ETMT (and also the name of the facility from MHIC to MHT).

The sources in *Attachment #2* that are highlighted by DEP are those that have previously met alternative RACT II requirements and emission restrictions.[5] As none of these sources have been modified or changed since October 24, 2016, the due date for the RACT II proposal, ETMT has included in the RACT III proposal a limited alternative RACT III analysis, in accordance with 25 Pa. Code § 129.114(i), as follows, to demonstrate that RACT II is RACT III (see *Limited Alternative RACT III Analysis* section, below, for further discussion):

Source ID	Source Name	RACT III Provisions
031	Auxiliary Boiler 1	25 Pa. Code § 129.114(i)(1)(i)
033	Auxiliary Boiler 3	25 Pa. Code § 129.114(i)(1)(i)
034	Auxiliary Boiler 4	25 Pa. Code § 129.114(i)(1)(i)
115	Marine Vessel Loading	25 Pa. Code § 129.114(i)(1)(i)
139	Existing Cooling Towers[6]	25 Pa. Code § 129.114(i)(1)(i)
402	Blind Changing	25 Pa. Code § 129.114(i)(1)(i)
801	NSPS Subpart VV Fugitive Leaks	25 Pa. Code § 129.114(i)(1)(i)

III. Limited Alternative RACT III Analysis

In the limited alternative RACT III analysis, ETMT has provided a listing of all air pollution control technologies previously evaluated in the RACT II proposal, including discussion of their technical and economic feasibility (see *Attachment #3*), and has stated that, based on its review of entries in EPA's RACT/Best Available Control Technology (BACT)/Lowest Achievable Emissions Rate (LAER) Clearinghouse (RBLC), "[n]o new available [air pollution] control technologies were identified for the[se] sources … beyond those identified in the [RACT II proposal]." DEP concurs that no new pollutant-specific air cleaning device, air pollution control technology, or technique is available for these sources.) Accordingly, the only technically feasible air pollution control technologies ETMT has identified in the limited alternative RACT III analysis are the following for the auxiliary boilers: ultra-low NO_x burners (ULNB), selective non-catalytic reduction (SNCR), selective catalytic reduction (SCR), and ULNB and SCR.

In accordance with 25 Pa. Code § 129.114(i)(1), ETMT has compared the cost effectiveness of each of these air pollution control technologies with the cost effectiveness screening level value of $7,500 per ton of NO_x emissions reduced, as follows:[7]

Air Pollution Control Technology	NO_x Emissions (*tons/yr*)			Total Annual Cost	NO_x Cost Effectiveness (*$/ton*)
	Before Control	After Control	Reduction		
ULNB	86.0	60.2	25.8	$1,349,480	$52,331
SNCR	86.0	60.2	25.8	$312,690	$12,126
SCR	86.0	34.4	51.6	$1,294,812	$25,106
ULNB and SCR	86.0	34.4	51.6	$2,644,292	$51,271

As the cost effectiveness calculated for each of the air pollution control technologies in the RACT II proposal is greater than the cost effectiveness screening level value, ETMT is not required to perform a new economic feasibility analysis for any of air pollution control technologies, and they remain economically infeasible.

[5] The sources that are not highlighted are not the subject of this technical review memo and are not discussed further herein. That being said, the sources that are subject to alternative RACT III requirements and/or emission restrictions but were not subject to RACT II requirements or evaluated for RACT II will be addressed separately via a significant modification of the TVOP, for which ETMT submitted an application to DEP on December 20, 2022.

[6] While this source used to consist of multiple cooling towers, only one cooling tower, the 15-2B cooling tower, remains.

[7] While ETMT's limited alternative RACT III analysis did not include the summary of the economic feasibility analysis submitted with the RACT II proposal, pursuant to 25 Pa. Code § 129.114(i)(1)(i)(C), DEP has included the summary herein.

In accordance with 25 Pa. Code § 129.115(f), and as already required in the following conditions of the previously-modified (i.e., current) TVOP, ETMT shall maintain records of all information necessary to determine compliance with all applicable requirements of 25 Pa. Code §§ 129.111 and 129.114:

- Auxiliary boilers: Condition # 010(e), Section E (under Source Group 0), of the previously-modified TVOP.
- Marine vessel loading: Condition # 010(a), Section D (under Source ID 115), of the previously-modified TVOP.
- 15-2B cooling tower: Condition # 002, Section D (under Source ID 139), of the previously-modified TVOP.
- Blind changing: Condition # 006, Section D (under Source ID 103), of the previously-modified TVOP, and Condition #s 005–009, Section D (under Source ID 801), of the previously-modified TVOP.
- Non-NGLs-related fugitive emissions components: Condition #s 005–009, Section D (under Source ID 801), of the previously-modified TVOP.

Therefore, compliance with the alternative RACT II requirements and emission restrictions indicated in the TVOP assures compliance with the applicable alternative RACT III requirements and emission restrictions, and there are no changes to the TVOP conditions.

IV. Public Discussion

Since December 13, 2022, the date that ETMT submitted the RACT III proposal, DEP has not had any discussions with ETMT, EPA, or the public regarding the submittal.

V. Conclusion

DEP has analyzed ETMT's proposal for considering RACT II requirements as RACT III and also performed independent analysis. Based on the information provided by ETMT for its MHT and independently verified by DEP, DEP has determined that the RACT II requirements satisfy the RACT III requirements. The RACT III requirements are identical to the RACT II requirements and are as stringent as RACT II.

COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
October 16, 2017
484-250-5920
(Revised)

SUBJECT:	Title V Operating Permit Review Memo (Significant Modification – RACT II) Sunoco Partners Marketing & Terminals, L.P. Marcus Hook Borough, Delaware County Application No. 23-00119 APS: 823642, Auth Id: 1157332
To:	James D. Rebarchak Regional Manager Air Quality
From:	George A Eckert GAE Facility Permitting Section Air Quality
Through:	Janine Tulloch-Reid, PE JET 12/5/2017 Environmental Engineering Manager Chief, Facilities Permitting Air Quality

On October 19, 2016, the Department received an electronic application for a Significant Modification to address PADPE's RACT II regulations to the existing TVOP, number 23-00119, for the Sunoco Partners Marketing & Terminals, Marcus Hook facility (SPMT). A hard copy of this application arrived on October 24, 2016, with a follow-up application received on November 24th.

These applications are to address the RACT II regulations found in 25 Pa. Code §§ 129.96-100.

Administrative/Notifications

Application Received:	October 19, 2016
GIF:	N/A with this application.
Compliance History:	Submitted Semi-Annually.
Site Location:	100 Green Street, Marcus Hook, PA 19061
Coordination involvement:	None Required
Application Fee:	$750.00, received with application.
Municipal Notification:	Not required at the time of application.

RACT II affects many sources at the SPMT facility. However, most of these are not subject to the RACT II regulations as their potential emissions on a source-by-source bases are below the applicable thresholds or they meet the presumptive RACT II requirements that are noted in 25 Pa. Code § 129.96.

This significant modification deals with the individual sources and addresses the RACT II requirements found in 25 Pa. Code §§ 129.96 – 100. The affected sources for this regulation are as follows:

- Sources 031, 033 and 034 (Auxiliary Boilers) for NOx and VOC emissions (Presumptive (VOC) and Case-by-Case (NOx));
- T001 (NSPS Kb External Floating Roof Tanks) for VOC emissions (Exempt);
- T002 (NSPS Kb Internal Floating Roof Tanks) for VOC emissions (Exempt);
- T003 (NESHAP, Subpart R storage tanks) for VOC emissions (Exempt);
- T004 (NESHAP, Subpart EEEEE storage tanks) for VOC emissions (Exempt);
- Source 113 (6 diesel engines) Presumptive RACT II for NOx emissions, exempt from RACT II for VOC emissions. Continued compliance with the 1-hour NOx and VOC RACT;
- Source 300 (miscellaneous storage tanks) for VOC emissions (Exempt);
- Source 115 (Marine Vessel Loading) for VOC emissions (Case-by-Case);
- Source 116 (Marine Vessel Ballasting) for VOC emissions (Exempt);
- Source 139 (Cooling Towers) for VOC emissions (Presumptive and Case-by-Case for the 15-2B unit only);
- Source 367 (Diesel Storage Tank) for VOC emissions (exempt – VOC emissions less than 1.0 tpy);
- Source 368 (Vehicle refueling (gas/diesel) for VOC emissions (Presumptive);
- Source 402 (Blind changing) for VOC emissions (Case-by-Case);
- Source 701 (Waste water treatment) for VOC emissions (Exempt); and
- Source 801 (Fugitive Equipment) for VOC emissions (Case-by-Case).

RACT I. The RACT I permit was issued to Sunoco Inc (R&M) on June 6, 1995. Per the Federal Register, this entire Compliance Permit (Number CP-23-0001) was SIPped, except for the expiration date. There were approximately 40 individual sources that were SIPped, and only the following remain as active sources under the current owner:

- Diesel storm water pumps, permitted Source 113;
- Marine Vessel Loading, permitted Source 115;
- Middle Creek Conveyance, permitted Source 701; and
- Three (3) cooling towers, Source 139.

CASE BY CASE RACT

Case-by-case RACT involves conducting a "top-down" analysis as outlined in the US EPA Draft "New Source Review Workshop Manual". This was published in October 1990, but the procedures established are still followed today. This involves the use of the RACT/BACT/LAER Clearing house (RBLC), as well as the use of additional information available on the US EPA's website and information garnered from control device vendors.

A basic summary of this top-down analysis after determining the sources and pollutant (NOx and/or VOC) subject to the regulation is as follows:

1. Identify all available control technologies;
2. Eliminate the technically infeasible control technologies;
3. Rank the remaining control options by effectiveness;
4. Evaluate the remaining control options for economic, environmental and energy impacts in accordance with Section 4.2, Chapter 1, of the Office of Air Quality Planning and Standards (OAQPS) Air Pollution Control Cost Manual and document the results;
5. Finally, identify RACT based on the above steps.

Presumptive RACT II values.

PADEP has established the following presumptive RACT benchmarks with a 25% buffer in dollars per ton of pollutant removed:

NOx – $3500.00
VOC - $7000.00

Sources 031, 033, and 034 (Boilers). As each boiler is identical to the other and each uses the same control technology and fuel supply, RACT for these boilers is addressed only one time.

NOx emissions from these three units are controlled by Low NOx Burners and Flue Gas Recirculation (FGR) and the NOx emissions are monitored by CEMs. These three units are permitted to operate on natural gas as well as a mixture of process gas and natural gas. The process gas is supplemented with natural gas to increase the Btu value of the fuel.

The PTE for each boiler is calculated using the short-term emission limit of 0.05 lb/MMBtu and its rated capacity of 392.5 MMBtu/hr. This results in an individual NOx limit per boiler of 86.0 tpy. However, the three (3) boilers have a federally enforceable aggregate NOX limit of 92.71 tpy in their Title V Operating Permit.

Each boiler has a previous federally enforceable emission limit of 0.05 lbs NOx/MMBtu when firing on any fuel.

Operation on natural gas with an emission limit of 0.05 lbs/MMBtu demonstrates compliance with the presumptive RACT limit found in 25 Pa. Code § 129.97g)(1)(i).

Process gas is not defined as a presumptive RACT fuel for combustion units, therefore a case-by-case analysis needs to be performed for NOx.

These auxiliary boilers are emitters of NOx and VOCs. These boilers meet the presumptive RACT requirements for VOC emissions (25 Pa. Code § 129.97(d) through operation and maintenance in accordance with manufacturer's specifications and good operating practices. LNB and FGR are currently installed and operated on each of these Auxiliary Boilers; therefore those control options have not been evaluated further.

Available NOx Control Options

Selective Non-Catalytic Reduction (SNCR);
Flue Gas Recirculation (FGR);
Low NOx Burners (LNB);
Ultra-low NOx Burners (ULNB); and
Selective Catalytic Reduction (SCR).

Elimination of technically infeasible control technologies.

SNCR is considered to be technically feasible even though this system requires a minimum temperature of 1600°F while the exhaust gas temperatures for each boiler far less than that value.

Ranking of NOx Control Options

Control Option	Control efficiency
ULNB & SCR	60%
SCR	60%
SNCR	30%
ULNB	30%

Control technology evaluation. Control options showing dollar/ton of pollutant (NOx) removed:

UNLB	$52,331
SNCR	$12,126
SCR	$25,106
UNLB & SCR	$51,271

Identification of RACT.
SPMT has proposed the use of the current LNB and FGR to suffice for case-by-case RACT for these three boilers. The current permitted NOx emission limit of 0.05 lb/MMBtu (firing on natural gas or process gas) is considerably less than the natural gas presumptive RACT limit of 0.10 lb/MMBtu.

Summary – PADEP accepts the use of LNB and good operating practices with a NOX emission limit of 0.05 lbs/MMBtu as RACT II for these three boilers.

NOx Boiler MONITORING, RECORDKEEPING, and TESTING
Sources 031, 033, and 034. The NOx CEMs on these units currently monitor based on a 30-day rolling average. This will continue and complies with 25 Pa. Code § 129.100(a)(1).

VOC control from Boilers
The boilers will be operated and maintained in accordance with manufacturer's specifications and with good operating practices (Presumptive RACT II under 25 Pa. Code § 129.97(d)).

Source 115 - MARINE VESSEL LOADING (VOC emitting source). The potential VOC emissions from this source are 7.42 tpy, based on loading 20,000 barrels per day or petroleum products. This emission limit, based on the throughput limitation, has been placed into the TVOP as a federally enforceable permit condition.

Emissions are currently being routed to an existing Marine Vapor Recovery (MVR) system for capture and from there the emissions are ducted to the fuel supply line for the auxiliary boilers. If this gas cannot be sent to one of the boilers, it is then sent to the Ethylene Complex Flare having a destruction efficiency of 98%.

This source is subject to 25 Pa. Code § 129.81 as well as 40 CFR 63, Subpart Y for the control of VOC emissions. 40 CFR 63, Subpart Y establishes federal RACT standards under CAA section 182(f) and MACT standards for the control of HAPs as required under CAA section 112. The EPA's RACT standards under Subpart Y require the reduction captured VOC emissions by 98% weight percent when using a combustion device, or by 95% weight when using a recovery device. This is more stringent than PADEP's reduction requirement of at least 90% by weight.

Identification of RACT. This source is currently required to operate a marine vessel combustor with a 98% reduction efficiency, which represents the level of control required by Subpart Y.

Summary – PADEP accepts the compliance with the requirements found in 40 CFR 63, Subpart Y as RACT for this source. No new conditions have been added for this source.

Source 116 - MARINE VESSEL BALLASTING (VOC emitting source).
The facility only permits loading or unloading of vessels that ballast with clean water or segregated ballast. The PTE for VOC emissions is less than 1.0 TPY and in accordance with 25 Pa. Code 129.96(c), this source is not subject to RACT II. This emission limit was calculated using formula 4, from AP-42, Section 5.2 and is based on a throughput of 1,201,562 gallons of ballast water per year.

This emission limit, based on the throughput limitation, has been placed into the TVOP as a federally enforceable permit condition.

Source 139 - COOLING TOWERS (Source of VOC emissions). Two of the cooling towers (15-6 and 17-1P) have federally enforceable existing VOC limits of less than 2.7 tpy making them not subject to RACT II under 25 Pa. Code § 129.97(c)(2).

The remaining cooling tower (15-2B) has a VOC emission limit of 4.6 TPY. As a source of fugitive VOC emissions that result from leaks in the cooling water bundles, these emissions pass directly to the atmosphere and are not able to be controlled via an add-on control device. The Title V permit requires that the equipment be inspected and monitored (I & M) to minimize and repair exchanger leaks.
SPMT has proposed the continued use of this practice to suffice for RACT. No new conditions have been added. See Condition #003.

Summary – PADEP accepts the use of the current I &M plan as RACT for the 15-2B cooling tower.

Source 367 - VEHICLE REFUELING (Diesel) (Source of VOC emissions). This tank is a fixed-roof design with a capacity of 10,000 gallons of diesel fuel. There are no regulations governing this storage tank, either because of its size or the low vapor pressure of what it stores. Based on an annual throughput of 100,000 gallons (10 turnovers), the VOC emissions (using Tanks 4.09D) will be approximately five (5) pounds. This is well below the 2.7 ton requirement for operating and maintaining the source in accordance with manufacturer's specification and with good operating practices as found in 25 Pa. Code § 129.97(c)(2). Note that the actual 2016 diesel usage is approximately 27,000 gallons, which results in less than two (2) lbs VOC/yr).

With such low actual emissions, it does not seem prudent to establish a throughput limit simply for the sake of monitoring and recordkeeping to document such compliance.

Summary. PADEP accepts the adherence to the presumptive RACT requirements of 25 Pa. Code § 129.97(c)(2) as RACT for this source.

Source 368 – Vehicle Refueling (Gasoline). (Source of VOC emissions). This tank is a 12,000 gallon above ground fixed roof storage tank used for refueling the fleet vehicles at this facility. The storage tank is subject to the requirements found in 25 Pa. Code §§ 129.61 and 82. In accordance with 25 Pa. Code § 129.96(a), this source is not subject to the RACT II regulations.

Blind changing (Source 402) and Fugitive Equipment, (801) – FUGITIVE VOC SOURCES (Source of VOC emissions). These sources consist of multiple flanges, relief valves, connectors, sampling connections, etc…, which are located in the various piping components found throughout this facility. Fugitive emissions are defined as those that cannot reasonably pass through a stack, chimney, vent or other equivalent opening. It is not appropriate to establish an emission limit as fugitive component leaks are unpredictable. According to the NSR Workshop Manual (EPA, 1990), it is unreasonable to expect that relatively small quantities of VOC emissions could be captured and rented to a stack. Therefore, SPMT proposes following the current NSPS Subpart VV requirements to satisfy RACT for these fugitive sources.

Summary – PADEP accepts the adherence to the LDAR requirements in NSPS, Subpart VV as sufficing for RACT for these fugitive sources.

PRESUMPTIVE RACT

Presumptive RACT source categories and limitations are found in 25 Pa. Code § 129.97.

The following are classified as presumptive RACT sources:

Sources 031, 033, and 034 for VOC as they already comply with the requirements found in 25 Pa. Code § 129.97(d) by operating and maintaining these units in accordance with manufacturer's specifications and good operating practices. (See Section B, #007, and Section C, #031 as these conditions apply to all sources at the entire facility).

Source 113 – six (6) diesel engine pumps. Each engine has a limit of not to exceed 499 hours in any 12 consecutive month period making the units subject to the requirements found in 25 Pa. code § 129.97(c)(8). See conditions #005, 009, and 010 for this source.

T001, T002, T003, T004, and Source 300. Each of these sources are subject to the regulations found in25 Pa. Code §§ 129.56, or 57. In accordance, with 25 Pa. Code 129.96(a), these sources are exempted from RACT II. These two regulations are cited at least once for each of these sources.

Source 701. This source has a federally enforceable VOC limit of 0.9 TPY from an earlier permit. This is less than 2.7 tons and therefore are exempted under 25 Pa. Code § 129.97(c)(2). See Condition #001 for this source.

Clean Air Act, Section 110(l). All applicable requirements from RACT I (one-hour RACT) have been incorporated into this operating permit. There has been no relaxation or anti-backsliding of any regulations or previous permit conditions.

Public Participation

Notices were published as follows:

PA Bulletin notice on December 10, 2016
Company notified via email on November 21, 2016
US EPA notified via email on November 21, 2016
Newspaper notice published in the Delaware County Daily Times on November 23, 2016.

No comments on the permit were received from the permittee, the public, or the US EPA.

Public Hearing

A hearing was scheduled for July 13, 2017 at the Department's Southeast Regional Office, but was cancelled due to lack of interested participants.

Comments concerning the RACT Application were received from the EPA via email on January 11, 2017 and are addressed below.

General Comment

COMMENT: As required under 25 Pa Code 129.92, the reasonably available control technology (RACT) Proposal must include potential-to-emit (PTE) of nitrogen oxides (NOx) and/or volatile organic compounds (VOC) for all affected sources subject to case-by-case RACT. PTE was not provided for many of the affected VOC sources.

RESPONSE: VOC potentials for the following sources have been identified:

- ***Source 115 Marine Vessel Loading – VOC PTE of 7.42 tons based on 20 MBPD of petroleum products loading. The supporting calculations are attached to the email. This emission limit, based on the throughput limitation of 20,000 bbl/hr (840,000 gal/hr), has been placed into the TVOP as a federally enforceable condition.***

- ***Source 116 Marine Vessel Ballasting – SPMT proposed a PTE of less than 1.0 TPY VOC should be established. SPMT will monitor ballasting operations and track VOC emissions to be reported annually as part of the PADEP AIMS report. This emission limit, based on a throughput limitation of 1,201,562 gallons of ballast water per year, has been placed into the TVOP as a federally enforceable condition.***

- ***Source 402 Blind Changing – It is not appropriate to establish a PTE as fugitive component leak rates are unpredictable.***

- ***Source 801 Fugitives – It is not appropriate to establish a PTE as fugitive component leak rates are unpredictable.***

COMMENT: SPMT is relying on Federal requirements to comply with the RACT II requirements in 25 PA Code section 129.99 for some of the affected sources, such as maximum available control technology (MACT) standards and new source performance standards (NSPS). EPA wants to clarify that although these requirements are Federally enforceable, Pennsylvania Department of Environmental Protection (PADEP) must still submit each of the source-specific requirements proposed to meet RACT for approval and incorporation into the Pennsylvania state implementation plan (SIP), in order to satisfy RACT requirements of the Clean Air Act (CAA) under the 1997 and 2008 8-hour ozone national ambient air quality standards (NAAQS).

- Sunoco owned and operated a refinery facility in Marcus Hook, PA (Marcus Hook Refinery) which was subject to a previous RACT determination resulting in EPA's approval of Operating Permit CP-23-0001 (issued on June 8, 1995) into the SIP. These requirements continue to be in place and Federally enforceable.
    - Please clarify the operating status of any emissions unit subject to the previous RACT determination and the RACT requirements specified in the SIP-approved permit CP-23-0001.

RESPONSE: Many of the sources from the SIP- approved permit, number CP-23-0001, have been permanently removed from service. These are as follows:

- ***Process Heaters, (1 in the 15-1 plant, 3 in the 15-5 plant, and 2 in the 12-3 plant (Condition 4.A.).***

- *No 1. CO Boiler Auxiliary Burners, Boilers 2, 3, 4, and 5, 10-4 Catalytic Cracker Feed Heater, BTX reforming heater, and Octane Reforming HTR-101 (Condition 5.A.)*
- *Boiler #1 (Condition 5.B.)*
- *Boiler #6 (Condition 5.C.)*
- *Boiler #7 (Condition 5.D.)*
- *2 heaters, 2 flares, and the No. 1 CO Boiler (Condition 5.F.)*
- *7 heaters (Condition 5.G.)*
- *2 crude heaters, and the crude and vacuum distillation heater (Condition 5.H.)*
- *Tank Truck Loading of Xylene and Toluene (Condition 6.B).*
- *Facility Emission Reduction Credits (ERCs) (Condition 8).*
- *Polymer grade propylene unloading, storage, and transfer (Condition 9).*

Additionally, only three of the thirteen cooling towers (15-6, 15-2B, and 17-1) (Condition 6.C.) remain in service. These remaining three cooling towers continue to operate in accordance with their RACT I permit conditions and can be found in Source ID Number 139.

COMMENT: For any sources at the Marcus Hook Refinery that have been permanently removed from the existing facility, EPA recommends PADEP to remove any 1-hour RACT requirements from the SIP.

RESPONSE: The Department will work with its Central Office on removing the 1-hour RACT sources from the SIP.

COMMENT: For any emissions unit subject to 1-hour RACT requirements that continue to be in operation to date, please clarify what are the applicable RACT requirements to date under the 1997 and 2008 8-hour ozone NAAQS.

- If these units are subject to 25 PA Code section 129.99, PADEP must ensure that the proposed requirements are as or more stringent than the existing RACT requirements.

RESPONSE: The following RACT I permitted sources continue to adhere to the RACT I and RACT II permit limits. These include:

- ***Diesel storm water pumps (RACT permit Condition 5.E.). Permitted Source 113.***
- ***Marine Vessel Loading (RACT permit Condition 6.A.) Permitted Source 115.***
- ***Middle Creek Conveyance (RACT permit Condition 7.D) Permitted Source 701.***

Each of these three sources are subject to the RACT II regulations and any streaming, if any, has been addressed in the technical review memo and the RACT Permit, using the regulatory citation of 25 Pa. Code § 129.97(i).

<u>Boilers 031, 033, and 034</u>

- As indicated, each boiler is allowed to combust either natural gas, process gas, or a combination thereof. The facility's RACT Proposal intended to address case-by-case NOx RACT for these boilers for their combustion of process heater gas, as the RACT II rule does not address this type of fuel combustion. However, the proposed emissions limit of 0.05 pound of NOx per heat input rating in million British Thermal Unit (lb/MMBTU) is applicable when firing on either fuel or combination thereof.

COMMENT: For practical enforceability, EPA recommends to specify the applicable fuel or fuels related to this RACT emissions limit, as part of the source-specific RACT permit conditions. Please clarify if the facility is proposing to consider this limit as RACT for both fuels.

RESPONSE: These boilers are designed to operate on either:

1. natural gas; or

> *2. a mixture of process gas and natural gas, where natural gas is used as a supplement to increase the Btu value of the process gas.*
> *The boilers cannot co-fire these fuels except when pre-mixed as noted in #2, above. The current permitted NOx limit applies to both types of fuel and was established as BAT at the time of installation. The current NOx emission limit when firing on natural gas complies with the presumptive limit of 0.1 lbs/MMBtu and is not discussed. There is no presumptive limit for process gas and the case-by-case RACT II analysis now addresses the firing on the mixture of process gas and natural gas.*

COMMENT: Please clarify the basis for the potential emissions used in estimating cost-effectiveness for each control (referring to 86.0 TPY).

> ***Response: The RACT Analysis was completed on a source-by-source basis. Each Auxiliary Boiler has the capability of emitting 86 TPY of NO_x if each were fired at 392.5 MMBtu/hr at an emission rate of 0.05 lb NO_x/MMBtu. However, as indicated in Title V Operating Permit 23-00119, Sources 031, 033, and 034, Condition #001 for each boiler, the collection of the three boilers is limited to a total of 92.71 TPY of NO_x for PSD/NSR purposes.***

COMMENT: Document and explain cost methodology used in evaluating cost-effectiveness for each control evaluated for the boilers.

> ***Response: All control costs are derived from Alternative Control Techniques Document - NOx Emissions from Utility Boilers - EPA-453/R-94-023 but scaled from 1994 to 2015 dollars using the cost escalation factor, which are derived from Chemical Engineering Cost Indices (See Attachment G of the RACT Proposal). The Annualized Cost Factor that is used to discount the Total Capital Investment was developed based on the EPA Air Pollution Control Cost Manual, Sixth Edition, EPA/452/B-02-001 - Equation 2.8a. Example calculations can be provided, if needed.***

Storage Tanks- T001 and T002

COMMENT: The facility's RACT Proposal lists tanks T001 and T002 as subject to case-by-case RACT requirements under 25 PA Code section 129.99, but yet PADEP has listed them as exempt sources in its Technical Review Memo. Clarify this inconsistency.

> ***RESPONSE: This was an oversight by the permittee in the application. The storage tanks in sources T001 and T002 are subject to the presumptive RACT requirements found in 25 Pa. Code §§ 129.56 (this is already addressed in the permit) and therefore are not subject to RACT II.***

COMMENT: In the RACT Proposal, the facility compares the requirements of 25 PA Code sections 129.56 and 129.57 to the Federal requirements under 40 CFR 60, Subpart Kb, and ultimately proposes the latter as RACT.

Clarify if T001 and T002 tanks are subject to 25 Pa Code 129.56 or 129.57. If they are subject to either of these rules, then these tanks would be exempt of the RACT II, as specified in 129.96. Otherwise, the tanks would be subject to case-by-case RACT under 129.99, for which the facility must submit a complete RACT analysis consisting of evaluating all available control technologies considering technical and economic feasibility. Such control analysis was not provided for tanks T001 and T002.

> ***RESPONSE: The storage tanks in these source groups is subject to the presumptive RACT requirements found in 25 Pa. Code § 129.56 and are not subject to RACT II.***

Marine Vessel Loading (Source 115)

COMMENT: Marine vessel loading is subject to 25 PA Code 129.81 requirements and 40 CFR 63, Subpart Y for the control of VOC emissions. EPA notes that 40 CFR 63, Subpart Y establishes Federal

RACT standards required under CAA section 182 (f) and MACT standards for the control of HAPs as required under CAA section 112. Specifically, EPA's RACT standards require the reduction captured VOC emissions by 98% weight percent when using a combustion device, or by 95% weight when using a recovery device. On the other hand, 25 Pa Code section 129.81 requires to process VOC vapors through a vapor recovery or destruction device to reduce by at least 90% by weight. To comply with these requirements, the facility is required to operate a marine vessel combustor with a 98% weight reduction efficiency, which represents the level of control required by EPA RACT standards. Because EPA RACT standards are more stringent than the requirements in 25 PA Code 129.81 for marine vessel loading, 40 CFR 63, Subpart Y should constitute RACT on this proposal.

REPSONSE: The Marine Vessel Loading source is subject to the 40 CFR 63, Subpart Y, which establishes federal RACT standards. The review memo now clearly states that the federal RACT requirements from this subpart suffice as RACT II for this source.

Diesel Storage Tank- Source 367

COMMENT: Please clarify what is the emissions source with ID 367. The facility's RACT Proposal lists both Sources 367 and 368 as vehicle refueling (for diesel and gasoline respectively), which is inconsistent with PADEP's Technical Review Memo, where Source 367 is listed as a diesel storage tank.

RESPONSE: The Department separated the two storage tanks in questions (Tanks 367 for diesel and 368 for gasoline) after the application had been submitted as the applicable regulatory requirements are different. This storage tank (diesel refueling) is not subject to RACT II as its PTE is less than 1 TPY (see 25 Pa. Code § 129.96(c)). This is now stated in the review memo.

COMMENT: If there are VOC emissions being produced from storage at the tank and during vehicle refueling, PADEP should address both emitting sources or activities for RACT, if VOC PTE is above 2.7 TPY.

RESPONSE: The PTE for Source 367 is below the 1.0 ton/yr threshold and is therefore not subject to RACT II. Please see the attached emission calculation based on the algorithms from Tanks 4.09D.

COMMENT: In the RACT Proposal, the facility compares the requirements of 25 PA Code sections 129.57 to the Federal requirements under 40 CFR 60, Subpart Kb for Source 367, and ultimately proposes the latter as RACT.

Clarify if Source 367 is subject to 25 Pa Code 129.57. If it is subject to this rule, then the tank would be exempt of the RACT II, as specified in 129.96. Otherwise, the tank would be subject to case-by-case RACT under 129.99, for which the facility must submit a complete RACT analysis consisting of evaluating all available control technologies considering technical and economic feasibility.

RESPONSE: Source 368 is a gasoline storage tank that used Stage II vapor recovery for the control of VOC emissions. The source is subject to 25 PA. Code § 129.57, and is therefore not subject to the RACT II regulations.

Vehicle Refueling- Source 368

PADEP's Technical Review Memo lists this source as subject to presumptive RACT on Page 2, but this is not inconsistent with the facility's RACT Proposal. This source is subject to PA requirement in 25 PA Code section 129.57 and 129.61, thus should be exempt of the RACT II Rule, as specified under section 129.96

RESPONSE: At the time of the RACT application submittal, Storage tanks 367 and 368 were both listed as Source 367 in the Title V operating permit. As the regulations governing the storage of gasoline and diesel fuels are different, PADEP separated the two storage tanks. These two tanks are discussed in detail above.

Recommendation

I recommend issuance of significant operating permit modification to address the Case-by-Case RACT II requirements found in 25 Pa. Code §§ 129.96-100.

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
031	Auxiliary Boiler 1	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
033	Auxiliary Boiler 3	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
034	Auxiliary Boiler 4	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
101[a]	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	N/A - Not a Source of NO_X		
102[a]	Refrigerated Propane Tank (500K BBL)	500K BBL	Propane	N/A - Not a Source of NO_X		
103	NSPS Subpart VVa Fugitive Equipment Leaks	N/A	N/A	N/A - Not a Source of NO_X		
104[a]	Marine Vessel Loading (Refrigerated)	N/A	Ethane/Propane/Butane	N/A - Not a Source of NO_X		
105[a]	Cavern	N/A	N/A	N/A - Not a Source of NO_X		
106A[a]	Demethanizer	N/A	Ethane/Propane/Methane	N/A - Not a Source of NO_X		
111[a]	Natural Gasoline Loading Rack	N/A	Pentane/Natural Gas/Naphtha	N/A - Not a Source of NO_X		
112	New Cooling Towers	1.8 MGPH	Water	N/A - Not a Source of NO_X		
113[b]	(6) Diesel Engine Pumps	Various	#2 Oil	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
115	Marine Vessel Loading	N/A	Petroleum Products	N/A - Not a Source of NO_X		
116	Marine Vessel Ballasting	N/A	Ballast Water	N/A - Not a Source of NO_X		
117	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	N/A - Not a Source of NO_X		
118	Refrigerated Butane Tank (575K BBL)	575K BBL	Butane	N/A - Not a Source of NO_X		
119	Refrigerated Propane Tank (900K BBL)	900K BBL	Propane	N/A - Not a Source of NO_X		
120	Refrigerated Propane Tank (589K BBL)	589K BBL	Propane	N/A - Not a Source of NO_X		
121	Tank 139 Int Float 6.5 MBBL	6.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
122	Tank 130 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
123	Tank 131 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
128	Tank 234 Int Float 70.1 MBBL	70.1M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
130	Tank 132 Int Float 14.6 MBBL	14.6M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
132	Tank 242 Int Float 69.2 MBBL	69.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
133	Tank 246 Int Float 54.4 MBBL	52.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
134	Tank 248 Int Float 52.4 MBBL	52.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
136	Tank 250 Int Float 80.4 MBBL	80.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
139	Existing Cooling Towers	475 GPH	Recycle Water	N/A - Not a Source of NO_X		
146	Tank 344 Fixed Roof 190.3 MBBL	190.3M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
148	Tank 352 Int Float 179.7 MBBL	179.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
149	Tank 353 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
150	Tank 354 Int Float 182.2 MBBL	182.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
151	Tank 355 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
177	Tank 524 Int Float 75.7 MBBL	75.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
178	Tank 527 Int Float 69.7 MBBL	69.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
179	Tank 528 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
180	Tank 529 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
182	Tank 594 Ext Float 81.3 MBBL	81.3M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
188	Tank 607 Int Float 100 MBBL	100M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
190	Tank 609 Int Float 98.17 MBBL	98.17M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
192	Tank 611 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
202	Tank 3 Int Float 41.0 MBBL	41.0M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
204	Tank 253 Int Float 90.5 MBBL	90.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
212	Tank 610 Int Float 96.0 MBBL	96.0M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
225	Tank 638 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
300	MISC Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
302	Tank 2 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
357	Tank 357 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
358	Tank 358 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
367	Vehicle Refueling - Diesel	N/A	Diesel Fuel	N/A - Not a Source of NO_X		
368	Vehicle Refueling - Gasoline	N/A	Gasoline	N/A - Not a Source of NO_X		
402	Blind Changing	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
403[(b)]	NESHAP ZZZZ Fire Pumps (2)	662 hp each	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
404[(b)]	NSPS IIII Emergency Generator	619 hp	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
405	NSPS IIII Fire Pumps (4)	800 hp each	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
701	Wastewater Treatment System	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
801	NSPS Subpart VV Fugitive Leaks	N/A	N/A	N/A - Not a Source of NO_X		
T001	NSPS Kb Ext Float Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T002	NSPS Kb Int Float Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T003	NESHAP Subpart R Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T004	NESHAP Subpart EEEE Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
C01	West Cold Flare (Modified)	240 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C02	East Cold Flare (New Tanks Project)	117 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

[(a)] The previous iteration of RACT (RACT II Rule) was promulgated in April 2016. During the RACT II evaluation period, the Facility underwent a reconfiguration so that it could operate as a petroleum terminal instead of the petroleum refinery. As a result of this reconfiguration, these Source IDs were added to TVOP No. 23-00119 after completion of the RACT II evaluation and associated submittals to PADEP.

[(b)] Energy Transfer previously received guidance from U.S. EPA on August 1, 2013, that the engines do not meet the definition of emergency under the 40 CFR 60, Subpart ZZZZ requirements. However, TVOP No. 23-00119, Section D, Source 113, Condition 005 includes a federally enforceable requirement limiting each engine to 499 hours of operation in any 12-month consecutive period. Therefore, Source ID 113 will meet the presumptive RACT requirements of under 25 Pa. Code §129.112(c)(10).

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
031	Auxiliary Boiler 1	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
033	Auxiliary Boiler 3	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
034	Auxiliary Boiler 4	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
101[(a)]	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
102[(a)]	Refrigerated Propane Tank (500K BBL)	50K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
103	NSPS Subpart VVa Fugitive Equipment Leaks	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	24 Pa. Code §129.114(c)	Case-by-case RACT determination.
104[(a)]	Marine Vessel Loading (Refrigerated)	N/A	Ethane/Propane/Butane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
105[(a)]	Cavern	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
106A[(a)]	Demethanizer	N/A	Ethane/Propane/Methane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
111[(a)]	Natural Gasoline Loading Rack	N/A	Pentane/Naptha/Natural gas	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
112	New Cooling Towers	1.8 MGPH	Water	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
115	Marine Vessel Loading	N/A	Petroleum Products	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
116	Marine Vessel Ballasting	N/A	N/A	N/A - Not a Source of VOC		
117	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
118	Refrigerated Butane Tank (575K BBL)	575K BBL	Butane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
119	Refrigerated Propane Tank (900K BBL)	900K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
120	Refrigerated Propane Tank (589K BBL)	589K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
121	Tank 139 Int Float 6.5 MBBL	6.5M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
122	Tank 130 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	Refer to Source ID T001		
123	Tank 131 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	Refer to Source ID T001		
128	Tank 234 Int Float 70.1 MBBL	70.1M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
130	Tank 132 Int Float 14.6 MBBL	14.6M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
132	Tank 242 Int Float 69.2 MBBL	69.2M BBL	Petroleum Liquids	Refer to Source ID T002		
133	Tank 246 Int Float 54.4 MBBL	52.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
134	Tank 248 Int Float 52.4 MBBL	52.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
136	Tank 250 Int Float 80.4 MBBL	80.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
139	Existing Cooling Towers	475 GPH	Recycle Water	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
146[(b)]	Tank 344 Fixed Roof 190.3 MBBL	190.3M BBL	Petroleum Liquids	Refer to Source ID T003		
148	Tank 352 Int Float 179.7 MBBL	179.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
149	Tank 353 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
150	Tank 354 Int Float 182.2 MBBL	182.2M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
151	Tank 355 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
177	Tank 524 Int Float 75.7 MBBL	75.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
178	Tank 527 Int Float 69.7 MBBL	69.7M BBL	Petroleum Liquids	Refer to Source ID T002 and T004		
179	Tank 528 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	Refer to Source ID T001 and T003		
180	Tank 529 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	Refer to Source ID T001		
182	Tank 594 Ext Float 81.3 MBBL	81.3M BBL	Petroleum Liquids	Refer to Source ID T002		
188	Tank 607 Int Float 100 MBBL	100M BBL	Petroleum Liquids	Refer to Source ID T002		
190	Tank 609 Int Float 98.17 MBBL	98.17M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
192	Tank 611 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	Refer to Source ID T002		

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
202	Tank 3 Int Float 41.0 MBBL	41.0M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
204	Tank 253 Int Float 90.5 MBBL	90.5M BBL	Petroleum Liquids	Refer to Source ID T002		
212	Tank 610 Int Float 96.0 MBBL	96.0M BBL	Petroleum Liquids	Refer to Source ID T003		
225	Tank 638 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
302	Tank 2 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
357	Tank 357 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source ID T002		
358	Tank 358 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source ID T002		
402	Blind Changing	N/A	Petroleum Liquids	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
801	NSPS Subpart VV Fugitive Leaks	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
C01	West Cold Flare (Modified)	240 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C02	East Cold Flare (New Tanks Project)	117 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

[a] The previous iteration of RACT (RACT II Rule) was promulgated in April 2016. During the RACT II evaluation period, the Facility underwent a reconfiguration so that it could operate as a petroleum terminal instead of the petroleum refinery. As a result of this reconfiguration, these Source IDs were added to TVOP No. 23-00119 after completion of the RACT II evaluation and associated submittals to PADEP.

[b] Source has been emptied and deactivated and has not been in operation for over five years as of this notification.

Table A-3
RACT III Exempt Source Summary
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Pollutant	Reason for Exemption	RACT III Citation
113	(6) Diesel Engine Pumps	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
121	Tank 139 Int Float 6.5 MBBL	VOC	Refer to Source IDs T002 and T003	
122	Tank 130 Ext Float 208.5 MBBL	VOC	Refer to Source ID T001	
123	Tank 131 Ext Float 208.5 MBBL	VOC	Refer to Source ID T001	
128	Tank 234 Int Float 70.1 MBBL	VOC	Refer to Source IDs T002 and T003	
130	Tank 132 Int Float 14.6 MBBL	VOC	Refer to Source IDs T002 and T003	
132	Tank 242 Int Float 69.2 MBBL	VOC	Refer to Source ID T002	
133	Tank 246 Int Float 54.4 MBBL	VOC	Refer to Source IDs T002 and T003	
134	Tank 248 Int Float 52.4 MBBL	VOC	Refer to Source IDs T002 and T003	
136	Tank 250 Int Float 80.4 MBBL	VOC	Refer to Source IDs T002 and T003	
146	Tank 344 Fixed Roof 190.3 MBBL	VOC	Refer to Source ID T003	
148	Tank 352 Int Float 179.7 MBBL	VOC	Refer to Source IDs T002 and T003	
149	Tank 353 Int Float 189.7 MBBL	VOC	Refer to Source IDs T002 and T003	
150	Tank 354 Int Float 182.2 MBBL	VOC	Refer to Source IDs T002 and T003	
151	Tank 355 Int Float 189.7 MBBL	VOC	Refer to Source IDs T002 and T003	
177	Tank 524 Int Float 75.7 MBBL	VOC	Refer to Source IDs T002 and T003	
178	Tank 527 Int Float 69.7 MBBL	VOC	Refer to Source ID T002 and T004	
179	Tank 528 Ext Float 149.2 MBBL	VOC	Refer to Source ID T001 and T003	
180	Tank 529 Ext Float 149.2 MBBL	VOC	Refer to Source ID T001	
182	Tank 594 Ext Float 81.3 MBBL	VOC	Refer to Source ID T002	
188	Tank 607 Int Float 100 MBBL	VOC	Refer to Source ID T002	
190	Tank 609 Int Float 98.17 MBBL	VOC	Refer to Source IDs T002 and T004	
192	Tank 611 Int Float 87.8 MBBL	VOC	Refer to Source ID T002	
202	Tank 3 Int Float 41.0 MBBL	VOC	Refer to Source IDs T002 and T004	
204	Tank 253 Int Float 90.5 MBBL	VOC	Refer to Source ID T002	
212	Tank 610 Int Float 96.0 MBBL	VOC	Refer to Source ID T003	
225	Tank 638 Int Float 87.8 MBBL	VOC	Refer to Source IDs T002 and T004	
300	MISC Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
302	Tank 2 Int Float 182.9 MBBL	VOC	Refer to Source IDs T002 and T004	
357	Tank 357 Int Float 182.9 MBBL	VOC	Refer to Source ID T002	
358	Tank 358 Int Float 182.9 MBBL	VOC	Refer to Source ID T002	
367	Vehicle Refueling - Diesel	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
368	Vehicle Refueling - Gasoline	VOC	Subject to 25 Pa. Code §129.57 and §129.61	25 Pa. Code §129.111(a)
403	NESHAP ZZZZ Fire Pumps (2)	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
404	NSPS IIII Emergency Generator	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
405	NSPS IIII Fire Pumps (4)	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
701	Wastewater Treatment System	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
T001	NSPS Kb Ext Float Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T002	NSPS Kb Int Float Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T003	NESHAP Subpart R Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T004	NESHAP Subpart EEEE Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
031	Auxiliary Boiler 1	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
033	Auxiliary Boiler 3	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
034	Auxiliary Boiler 4	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
101	Refrigerated Ethane Tank (300K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	300K BBL	Ethane
102	Refrigerated Propane Tank (500K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	50K BBL	Propane
103	NSPS Subpart VVa Fugitive Equipment Leaks	Fugitive Emissions	N/A	N/A	Marcus Hook Terminal	N/A	N/A
104	Marine Vessel Loading (Refrigerated)	Loading Operations	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Ethane/Propane/Butane
105	Cavern	Cavern	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	N/A
106A	Demethanizer	Natural Gas Processing Unit	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Ethane/Propane/Methane
111	Natural Gasoline Loading Rack	Loading Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Naphtha
112	New Cooling Towers	Cooling Tower	Cooling Tower Depot	CFF-363633-3I-28	Marcus Hook Terminal	1.8 Mgal/hr	Water
113	(6) Diesel Engine Pumps	Diesel Pumps	Caterpillar	3606/3512/3516	Marcus Hook Terminal	Various	#2 Oil
115	Marine Vessel Loading	Loading Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Petroleum Products
116	Marine Vessel Ballasting	Ballasting	Unknown	Unknown	Marcus Hook Terminal	N/A	Ballast Water
117	Refrigerated Ethane Tank (300K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	300K BBL	Ethane
118	Refrigerated Butane Tank (575K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	575K BBL	Butane
119	Refrigerated Propane Tank (900K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	900K BBL	Propane
120	Refrigerated Propane Tank (589K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	589K BBL	Propane
121	Tank 139 Int Float 6.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	6.5M BBL	Petroleum Liquids
122	Tank 130 Ext Float 208.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	208.5M BBL	Petroleum Liquids
123	Tank 131 Ext Float 208.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	208.5M BBL	Petroleum Liquids

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
128	Tank 234 Int Float 70.1 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	70.1M BBL	Petroleum Liquids
130	Tank 132 Int Float 14.6 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	14.6M BBL	Petroleum Liquids
132	Tank 242 Int Float 69.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	69.2M BBL	Petroleum Liquids
133	Tank 246 Int Float 54.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	52.4M BBL	Petroleum Liquids
134	Tank 248 Int Float 52.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	52.4M BBL	Petroleum Liquids
136	Tank 250 Int Float 80.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	80.4M BBL	Petroleum Liquids
139	Existing Cooling Towers	Cooling Tower	Self-constructed	Custom Design	Marcus Hook Terminal	475 GPH	Recycle Water
146	Tank 344 Fixed Roof 190.3 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	190.3M BBL	Petroleum Liquids
148	Tank 352 Int Float 179.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	179.7M BBL	Petroleum Liquids
149	Tank 353 Int Float 189.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	189.7M BBL	Petroleum Liquids
150	Tank 354 Int Float 182.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.2M BBL	Petroleum Liquids
151	Tank 355 Int Float 189.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	189.7M BBL	Petroleum Liquids
177	Tank 524 Int Float 75.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	75.7M BBL	Petroleum Liquids
178	Tank 527 Int Float 69.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	69.7M BBL	Petroleum Liquids
179	Tank 528 Ext Float 149.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	149.2M BBL	Petroleum Liquids
180	Tank 529 Ext Float 149.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	149.2M BBL	Petroleum Liquids
182	Tank 594 Ext Float 81.3 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	81.3M BBL	Petroleum Liquids
188	Tank 607 Int Float 100 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	100M BBL	Petroleum Liquids
190	Tank 609 Int Float 98.17 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	98.17M BBL	Petroleum Liquids
192	Tank 611 Int Float 87.8 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	87.8M BBL	Petroleum Liquids
202	Tank 3 Int Float 41.0 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	41.0M BBL	Petroleum Liquids

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
204	Tank 253 Int Float 90.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	90.5M BBL	Petroleum Liquids
212	Tank 610 Int Float 96.0 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	96.0M BBL	Petroleum Liquids
225	Tank 638 Int Float 87.8 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	87.8M BBL	Petroleum Liquids
300	MISC Tanks	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Petroleum Liquids
302	Tank 2 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
357	Tank 357 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
358	Tank 358 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
367	Vehicle Refueling - Diesel	Refueling Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
368	Vehicle Refueling - Gasoline	Refueling Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
402	Blind Changing	Blind Changing Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Petroleum Liquids
403	NESHAP ZZZZ Fire Pumps (2)	Emergency Fire Pump	Detroit Diesel	8083/71247312	Marcus Hook Terminal	662 hp each	Diesel Fuel
404	NSPS IIII Emergency Generator	Emergency Generator	Caterpillar	C15	Marcus Hook Terminal	619 hp	Diesel Fuel
405	NSPS IIII Fire Pumps (4)	Emergency Fire Pump	Caterpillar	C18	Marcus Hook Terminal	800 hp each	Diesel Fuel
701	Wastewater Treatment System	Wastewater Treatment Facility	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
801	NSPS Subpart VV Fugitive Leaks	Fugitive Emissions	N/A	N/A	Marcus Hook Terminal	N/A	N/A
T001	NSPS Kb Ext Float Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T002	NSPS Kb Int Float Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T003	NESHAP Subpart R Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T004	NESHAP Subpart EEEE Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
C01	West Cold Flare (Modified)	Flare	Flare Industries	FCA-3/10	Marcus Hook Terminal	240 cf/hr	Process Gas and Natural Gas
C02	East Cold Flare (New Tanks Project)	Flare	Flare Industries	Unknown	Marcus Hook Terminal	117 cf/hr	Process Gas and Natural Gas

Table 3

Technically Feasible Air Pollution Control Technologies Approved Under 25 Pa. Code §§129.99

Source ID	Source Name	Pollutant	Control Technologies	Feasiblity
031, 033, and 034	Auxiliary Boilers 1, 3, and 4	NO_X	Ultra-low NO_X Burners (ULNB)	Economically Infeasible - Cost per ton of NO_X is $52,331.
			Selective Non-Catalytic Reduction (SNCR)	Economically Infeasible - Cost per ton of NO_X is $12,126.
			Selective Catalytic Reduction (SCR)	Economically Infeasible - Cost per ton of NO_X is $25,106.
			ULNB and SCR	Economically Infeasible - Cost per ton of NO_X is $51,271.
115	Marine Vessel Loading	VOC	Thermal Incinerator	Technically Infeasible – the control efficiency is equal to or less than their current control efficiency of 98%.
			Adsorption	Technically Infeasible – the control efficiency is equal to or less than their current control efficiency of 98%.
			Condenser	Technically Infeasible – the control efficiency is equal to or less than their current control efficiency of 98%.
139	Existing Cooling Towers	VOC	There is no technically feasible add-on control option for the fugitive VOC emissions from the cooling towers. As required by the current TVOP 23-00119, Energy Transfer uses an equipment inspection and monitoring program to minimize and repair exchanger leaks and reduce VOC emissions from the cooling towers.	
402	Blind Changing	VOC	There is no technically feasible add-on control option for the fugitive VOC emissions. As required by the current TVOP 23-00119, this source must adhere to applicable 40 CFR Part 60, Subpart VVa and LDAR requirements.	
801	NSPS Subpart VV Fugitive Leaks	VOC	There is no technically feasible add-on control option for the fugitive VOC emissions. As required by the current TVOP 23-00119, this source must adhere to applicable 40 CFR Part 60, Subpart VV and LDAR requirements.	

25 Pa. Code §129.114(i)(1)(i)(C) – Summary of Previous Economic Feasibility Analyses

Energy Transfer did not determine any technically feasible control technologies for the sources listed in Table 3, except for Source IDs 031, 033 and 034. As part of Energy Transfer's RACT II submittal, Energy Transfer performed analyses under 25 Pa. Code §129.99(d) to determine which, if any, of the technically feasible control technologies identified for Source IDs 031, 033, and 034 were economically feasible using the methods presented in the "EPA Air Pollution Control Cost Manual" (Sixth Edition, EPA/452/B-02-0001, January 2002), as amended. Summaries of the economic feasibility analyses submitted under 25 Pa. Code §129.99(d). The corresponding cost

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
031	Auxiliary Boiler 1	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
033	Auxiliary Boiler 3	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
034	Auxiliary Boiler 4	392.5 MMBtu/hr	Process Gas and Natural Gas	Dual-fired combustion unit or process heater with a rated heat input greater than or equal to 50 MMBtu/hr	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
101[a]	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	N/A - Not a Source of NO_X		
102[a]	Refrigerated Propane Tank (500K BBL)	500K BBL	Propane	N/A - Not a Source of NO_X		
103	NSPS Subpart VVa Fugitive Equipment Leaks	N/A	N/A	N/A - Not a Source of NO_X		
104[a]	Marine Vessel Loading (Refrigerated)	N/A	Ethane/Propane/Butane	N/A - Not a Source of NO_X		
105[a]	Cavern	N/A	N/A	N/A - Not a Source of NO_X		
106A[a]	Demethanizer	N/A	Ethane/Propane/Methane	N/A - Not a Source of NO_X		
111[a]	Natural Gasoline Loading Rack	N/A	Pentane/Natural Gas/Naphtha	N/A - Not a Source of NO_X		
112	New Cooling Towers	1.8 MGPH	Water	N/A - Not a Source of NO_X		
113[b]	(6) Diesel Engine Pumps	Various	#2 Oil	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
115	Marine Vessel Loading	N/A	Petroleum Products	N/A - Not a Source of NO_X		
116	Marine Vessel Ballasting	N/A	Ballast Water	N/A - Not a Source of NO_X		
117	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	N/A - Not a Source of NO_X		
118	Refrigerated Butane Tank (575K BBL)	575K BBL	Butane	N/A - Not a Source of NO_X		
119	Refrigerated Propane Tank (900K BBL)	900K BBL	Propane	N/A - Not a Source of NO_X		
120	Refrigerated Propane Tank (589K BBL)	589K BBL	Propane	N/A - Not a Source of NO_X		
121	Tank 139 Int Float 6.5 MBBL	6.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
122	Tank 130 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
123	Tank 131 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
128	Tank 234 Int Float 70.1 MBBL	70.1M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
130	Tank 132 Int Float 14.6 MBBL	14.6M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
132	Tank 242 Int Float 69.2 MBBL	69.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		

Attachment #2

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
133	Tank 246 Int Float 54.4 MBBL	52.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
134	Tank 248 Int Float 52.4 MBBL	52.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
136	Tank 250 Int Float 80.4 MBBL	80.4M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
139	Existing Cooling Towers	475 GPH	Recycle Water	N/A - Not a Source of NO_X		
146	Tank 344 Fixed Roof 190.3 MBBL	190.3M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
148	Tank 352 Int Float 179.7 MBBL	179.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
149	Tank 353 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
150	Tank 354 Int Float 182.2 MBBL	182.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
151	Tank 355 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
177	Tank 524 Int Float 75.7 MBBL	75.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
178	Tank 527 Int Float 69.7 MBBL	69.7M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
179	Tank 528 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
180	Tank 529 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
182	Tank 594 Ext Float 81.3 MBBL	81.3M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
188	Tank 607 Int Float 100 MBBL	100M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
190	Tank 609 Int Float 98.17 MBBL	98.17M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
192	Tank 611 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
202	Tank 3 Int Float 41.0 MBBL	41.0M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
204	Tank 253 Int Float 90.5 MBBL	90.5M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
212	Tank 610 Int Float 96.0 MBBL	96.0M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
225	Tank 638 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
300	MISC Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
302	Tank 2 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
357	Tank 357 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
358	Tank 358 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	N/A - Not a Source of NO_X		
367	Vehicle Refueling - Diesel	N/A	Diesel Fuel	N/A - Not a Source of NO_X		
368	Vehicle Refueling - Gasoline	N/A	Gasoline	N/A - Not a Source of NO_X		
402	Blind Changing	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		

Table A-1
RACT III Rule Applicability Summary - NO_X Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	NO_X Limitation/Requirement
403[b]	NESHAP ZZZZ Fire Pumps (2)	662 hp each	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
404[b]	NSPS IIII Emergency Generator	619 hp	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
405	NSPS IIII Fire Pumps (4)	800 hp each	Diesel Fuel	Emergency standby engine operating less than 500 hours in a 12-month rolling period	25 Pa. Code §129.112(c)(10)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
701	Wastewater Treatment System	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
801	NSPS Subpart VV Fugitive Leaks	N/A	N/A	N/A - Not a Source of NO_X		
T001	NSPS Kb Ext Float Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T002	NSPS Kb Int Float Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T003	NESHAP Subpart R Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
T004	NESHAP Subpart EEEE Tanks	N/A	Petroleum Liquids	N/A - Not a Source of NO_X		
C01	West Cold Flare (Modified)	240 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C02	East Cold Flare (New Tanks Project)	117 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

[a] The previous iteration of RACT (RACT II Rule) was promulgated in April 2016. During the RACT II evaluation period, the Facility underwent a reconfiguration so that it could operate as a petroleum terminal instead of the petroleum refinery. As a result of this reconfiguration, these Source IDs were added to TVOP No. 23-00119 after completion of the RACT II evaluation and associated submittals to PADEP.

[b] Energy Transfer previously received guidance from U.S. EPA on August 1, 2013, that the engines do not meet the definition of emergency under the 40 CFR 60, Subpart ZZZZ requirements. However, TVOP No. 23-00119, Section D, Source 113, Condition 005 includes a federally enforceable requirement limiting each engine to 499 hours of operation in any 12-month consecutive period. Therefore, Source ID 113 will meet the presumptive RACT requirements of under 25 Pa. Code §129.112(c)(10).

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
031	Auxiliary Boiler 1	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
033	Auxiliary Boiler 3	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
034	Auxiliary Boiler 4	392.5 MMBtu/hr	Process Gas and Natural Gas	A combustion unit located at a major VOC facility not specified in subsection (c)	25 Pa. Code §129.112(d)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
101[a]	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
102[a]	Refrigerated Propane Tank (500K BBL)	50K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
103	NSPS Subpart VVa Fugitive Equipment Leaks	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	24 Pa. Code §129.114(c)	Case-by-case RACT determination.
104[a]	Marine Vessel Loading (Refrigerated)	N/A	Ethane/Propane/Butane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
105[a]	Cavern	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
~~106A[a]~~	~~Demethanizer~~	~~N/A~~	~~Ethane/Propane/Methane~~	~~VOC air contamination source with PTE >2.7 tpy VOC~~	~~25 Pa. Code §129.114(c)~~	~~Case-by-case RACT determination.~~
111[a]	Natural Gasoline Loading Rack	N/A	Pentane/Naptha/Natural gas	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
112	New Cooling Towers	1.8 MGPH	Water	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
115	Marine Vessel Loading	N/A	Petroleum Products	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
116	Marine Vessel Ballasting	N/A	N/A	N/A - Not a Source of VOC		
117	Refrigerated Ethane Tank (300K BBL)	300K BBL	Ethane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
118	Refrigerated Butane Tank (575K BBL)	575K BBL	Butane	VOC air contamination source with PTE <2.7 tpy VOC	25 Pa. Code §129.112(c)(2)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
119	Refrigerated Propane Tank (900K BBL)	900K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
120	Refrigerated Propane Tank (589K BBL)	589K BBL	Propane	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(c)	Case-by-case RACT determination.
121	Tank 139 Int Float 6.5 MBBL	6.5M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
122	Tank 130 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	Refer to Source ID T001		
123	Tank 131 Ext Float 208.5 MBBL	208.5M BBL	Petroleum Liquids	Refer to Source ID T001		
128	Tank 234 Int Float 70.1 MBBL	70.1M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
130	Tank 132 Int Float 14.6 MBBL	14.6M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
132	Tank 242 Int Float 69.2 MBBL	69.2M BBL	Petroleum Liquids	Refer to Source ID T002		
133	Tank 246 Int Float 54.4 MBBL	52.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
134	Tank 248 Int Float 52.4 MBBL	52.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
136	Tank 250 Int Float 80.4 MBBL	80.4M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
139	Existing Cooling Towers	475 GPH	Recycle Water	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
146[(b)]	Tank 344 Fixed Roof 190.3 MBBL	190.3M BBL	Petroleum Liquids	Refer to Source ID T003		
148	Tank 352 Int Float 179.7 MBBL	179.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
149	Tank 353 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
150	Tank 354 Int Float 182.2 MBBL	182.2M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
151	Tank 355 Int Float 189.7 MBBL	189.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
177	Tank 524 Int Float 75.7 MBBL	75.7M BBL	Petroleum Liquids	Refer to Source IDs T002 and T003		
178	Tank 527 Int Float 69.7 MBBL	69.7M BBL	Petroleum Liquids	Refer to Source ID T002 and T004		
179	Tank 528 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	Refer to Source ID T001 and T003		
180	Tank 529 Ext Float 149.2 MBBL	149.2M BBL	Petroleum Liquids	Refer to Source ID T001		
182	Tank 594 Ext Float 81.3 MBBL	81.3M BBL	Petroleum Liquids	Refer to Source ID T002		
188	Tank 607 Int Float 100 MBBL	100M BBL	Petroleum Liquids	Refer to Source ID T002		
190	Tank 609 Int Float 98.17 MBBL	98.17M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
192	Tank 611 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	Refer to Source ID T002		

Table A-2
RACT III Rule Applicability Summary - VOC Emitting Sources
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Capacity/ Throughput	Fuel/Throughput Material	RACT III Applicability		
				Classification	Citation	VOC Limitation/Requirement
202	Tank 3 Int Float 41.0 MBBL	41.0M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
204	Tank 253 Int Float 90.5 MBBL	90.5M BBL	Petroleum Liquids	Refer to Source ID T002		
212	Tank 610 Int Float 96.0 MBBL	96.0M BBL	Petroleum Liquids	Refer to Source ID T003		
225	Tank 638 Int Float 87.8 MBBL	87.8M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
302	Tank 2 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source IDs T002 and T004		
357	Tank 357 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source ID T002		
358	Tank 358 Int Float 182.9 MBBL	182.9M BBL	Petroleum Liquids	Refer to Source ID T002		
402	Blind Changing	N/A	Petroleum Liquids	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
801	NSPS Subpart VV Fugitive Leaks	N/A	N/A	VOC air contamination source with PTE >2.7 tpy VOC	25 Pa. Code §129.114(i)	Case-by-case RACT determination.
C01	West Cold Flare (Modified)	240 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.
C02	East Cold Flare (New Tanks Project)	117 cf/hr	Process Gas and Natural Gas	A flare primarily used for air pollution control	25 Pa. Code §129.112(c)(8)	Install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices.

[a] The previous iteration of RACT (RACT II Rule) was promulgated in April 2016. During the RACT II evaluation period, the Facility underwent a reconfiguration so that it could operate as a petroleum terminal instead of the petroleum refinery. As a result of this reconfiguration, these Source IDs were added to TVOP No. 23-00119 after completion of the RACT II evaluation and associated submittals to PADEP.

[b] Source has been emptied and deactivated and has not been in operation for over five years as of this notification.

Table A-3
RACT III Exempt Source Summary
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Pollutant	Reason for Exemption	RACT III Citation
113	(6) Diesel Engine Pumps	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
121	Tank 139 Int Float 6.5 MBBL	VOC	Refer to Source IDs T002 and T003	
122	Tank 130 Ext Float 208.5 MBBL	VOC	Refer to Source ID T001	
123	Tank 131 Ext Float 208.5 MBBL	VOC	Refer to Source ID T001	
128	Tank 234 Int Float 70.1 MBBL	VOC	Refer to Source IDs T002 and T003	
130	Tank 132 Int Float 14.6 MBBL	VOC	Refer to Source IDs T002 and T003	
132	Tank 242 Int Float 69.2 MBBL	VOC	Refer to Source ID T002	
133	Tank 246 Int Float 54.4 MBBL	VOC	Refer to Source IDs T002 and T003	
134	Tank 248 Int Float 52.4 MBBL	VOC	Refer to Source IDs T002 and T003	
136	Tank 250 Int Float 80.4 MBBL	VOC	Refer to Source IDs T002 and T003	
146	Tank 344 Fixed Roof 190.3 MBBL	VOC	Refer to Source ID T003	
148	Tank 352 Int Float 179.7 MBBL	VOC	Refer to Source IDs T002 and T003	
149	Tank 353 Int Float 189.7 MBBL	VOC	Refer to Source IDs T002 and T003	
150	Tank 354 Int Float 182.2 MBBL	VOC	Refer to Source IDs T002 and T003	
151	Tank 355 Int Float 189.7 MBBL	VOC	Refer to Source IDs T002 and T003	
177	Tank 524 Int Float 75.7 MBBL	VOC	Refer to Source IDs T002 and T003	
178	Tank 527 Int Float 69.7 MBBL	VOC	Refer to Source ID T002 and T004	
179	Tank 528 Ext Float 149.2 MBBL	VOC	Refer to Source ID T001 and T003	
180	Tank 529 Ext Float 149.2 MBBL	VOC	Refer to Source ID T001	
182	Tank 594 Ext Float 81.3 MBBL	VOC	Refer to Source ID T002	
188	Tank 607 Int Float 100 MBBL	VOC	Refer to Source ID T002	
190	Tank 609 Int Float 98.17 MBBL	VOC	Refer to Source IDs T002 and T004	
192	Tank 611 Int Float 87.8 MBBL	VOC	Refer to Source ID T002	
202	Tank 3 Int Float 41.0 MBBL	VOC	Refer to Source IDs T002 and T004	
204	Tank 253 Int Float 90.5 MBBL	VOC	Refer to Source ID T002	
212	Tank 610 Int Float 96.0 MBBL	VOC	Refer to Source ID T003	
225	Tank 638 Int Float 87.8 MBBL	VOC	Refer to Source IDs T002 and T004	
300	MISC Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
302	Tank 2 Int Float 182.9 MBBL	VOC	Refer to Source IDs T002 and T004	
357	Tank 357 Int Float 182.9 MBBL	VOC	Refer to Source ID T002	
358	Tank 358 Int Float 182.9 MBBL	VOC	Refer to Source ID T002	
367	Vehicle Refueling - Diesel	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
368	Vehicle Refueling - Gasoline	VOC	Subject to 25 Pa. Code §129.57 and §129.61	25 Pa. Code §129.111(a)
403	NESHAP ZZZZ Fire Pumps (2)	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
404	NSPS IIII Emergency Generator	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
405	NSPS IIII Fire Pumps (4)	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
701	Wastewater Treatment System	VOC	PTE less than 1 tpy	25 Pa. Code §129.111(c)
T001	NSPS Kb Ext Float Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T002	NSPS Kb Int Float Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T003	NESHAP Subpart R Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)
T004	NESHAP Subpart EEEE Tanks	VOC	Subject to 25 Pa. Code §129.56	25 Pa. Code §129.111(a)

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
031	Auxiliary Boiler 1	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
033	Auxiliary Boiler 3	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
034	Auxiliary Boiler 4	Dual Fuel Boiler	Foster Wheeler	AG5257	Marcus Hook Terminal	392.5 MMBtu/hr	Process Gas and Natural Gas
101	Refrigerated Ethane Tank (300K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	300K BBL	Ethane
102	Refrigerated Propane Tank (500K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	50K BBL	Propane
103	NSPS Subpart VVa Fugitive Equipment Leaks	Fugitive Emissions	N/A	N/A	Marcus Hook Terminal	N/A	N/A
104	Marine Vessel Loading (Refrigerated)	Loading Operations	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Ethane/Propane/Butane
105	Cavern	Cavern	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	N/A
106A	Demethanizer	Natural Gas Processing Unit	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Ethane/Propane/Methane
111	Natural Gasoline Loading Rack	Loading Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Naphtha
112	New Cooling Towers	Cooling Tower	Cooling Tower Depot	CFF-363633-3I-28	Marcus Hook Terminal	1.8 Mgal/hr	Water
113	(6) Diesel Engine Pumps	Diesel Pumps	Caterpillar	3606/3512/3516	Marcus Hook Terminal	Various	#2 Oil
115	Marine Vessel Loading	Loading Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Petroleum Products
116	Marine Vessel Ballasting	Ballasting	Unknown	Unknown	Marcus Hook Terminal	N/A	Ballast Water
117	Refrigerated Ethane Tank (300K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	300K BBL	Ethane
118	Refrigerated Butane Tank (575K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	575K BBL	Butane
119	Refrigerated Propane Tank (900K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	900K BBL	Propane
120	Refrigerated Propane Tank (589K BBL)	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	589K BBL	Propane
121	Tank 139 Int Float 6.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	6.5M BBL	Petroleum Liquids
122	Tank 130 Ext Float 208.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	208.5M BBL	Petroleum Liquids
123	Tank 131 Ext Float 208.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	208.5M BBL	Petroleum Liquids

Attachment #3

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
128	Tank 234 Int Float 70.1 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	70.1M BBL	Petroleum Liquids
130	Tank 132 Int Float 14.6 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	14.6M BBL	Petroleum Liquids
132	Tank 242 Int Float 69.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	69.2M BBL	Petroleum Liquids
133	Tank 246 Int Float 54.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	52.4M BBL	Petroleum Liquids
134	Tank 248 Int Float 52.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	52.4M BBL	Petroleum Liquids
136	Tank 250 Int Float 80.4 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	80.4M BBL	Petroleum Liquids
139	Existing Cooling Towers	Cooling Tower	Self-constructed	Custom Design	Marcus Hook Terminal	475 GPH	Recycle Water
146	Tank 344 Fixed Roof 190.3 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	190.3M BBL	Petroleum Liquids
148	Tank 352 Int Float 179.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	179.7M BBL	Petroleum Liquids
149	Tank 353 Int Float 189.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	189.7M BBL	Petroleum Liquids
150	Tank 354 Int Float 182.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.2M BBL	Petroleum Liquids
151	Tank 355 Int Float 189.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	189.7M BBL	Petroleum Liquids
177	Tank 524 Int Float 75.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	75.7M BBL	Petroleum Liquids
178	Tank 527 Int Float 69.7 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	69.7M BBL	Petroleum Liquids
179	Tank 528 Ext Float 149.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	149.2M BBL	Petroleum Liquids
180	Tank 529 Ext Float 149.2 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	149.2M BBL	Petroleum Liquids
182	Tank 594 Ext Float 81.3 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	81.3M BBL	Petroleum Liquids
188	Tank 607 Int Float 100 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	100M BBL	Petroleum Liquids
190	Tank 609 Int Float 98.17 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	98.17M BBL	Petroleum Liquids
192	Tank 611 Int Float 87.8 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	87.8M BBL	Petroleum Liquids
202	Tank 3 Int Float 41.0 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	41.0M BBL	Petroleum Liquids

Table A-4
RACT III Source Inventory
Energy Transfer Marketing & Terminals, LP - Marcus Hook, PA

Source ID	Source Name	Source Description	Make	Model	Location	Capacity	Fuel/Material Stored
204	Tank 253 Int Float 90.5 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	90.5M BBL	Petroleum Liquids
212	Tank 610 Int Float 96.0 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	96.0M BBL	Petroleum Liquids
225	Tank 638 Int Float 87.8 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	87.8M BBL	Petroleum Liquids
300	MISC Tanks	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	N/A	Petroleum Liquids
302	Tank 2 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
357	Tank 357 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
358	Tank 358 Int Float 182.9 MBBL	Storage Tank	Self-constructed	Custom Design	Marcus Hook Terminal	182.9M BBL	Petroleum Liquids
367	Vehicle Refueling - Diesel	Refueling Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
368	Vehicle Refueling - Gasoline	Refueling Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
402	Blind Changing	Blind Changing Operations	Unknown	Unknown	Marcus Hook Terminal	N/A	Petroleum Liquids
403	NESHAP ZZZZ Fire Pumps (2)	Emergency Fire Pump	Detroit Diesel	8083/71247312	Marcus Hook Terminal	662 hp each	Diesel Fuel
404	NSPS IIII Emergency Generator	Emergency Generator	Caterpillar	C15	Marcus Hook Terminal	619 hp	Diesel Fuel
405	NSPS IIII Fire Pumps (4)	Emergency Fire Pump	Caterpillar	C18	Marcus Hook Terminal	800 hp each	Diesel Fuel
701	Wastewater Treatment System	Wastewater Treatment Facility	Unknown	Unknown	Marcus Hook Terminal	N/A	N/A
801	NSPS Subpart VV Fugitive Leaks	Fugitive Emissions	N/A	N/A	Marcus Hook Terminal	N/A	N/A
T001	NSPS Kb Ext Float Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T002	NSPS Kb Int Float Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T003	NESHAP Subpart R Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
T004	NESHAP Subpart EEEE Tanks	Storage Tank	N/A	N/A	Marcus Hook Terminal	N/A	Petroleum Liquids
C01	West Cold Flare (Modified)	Flare	Flare Industries	FCA-3/10	Marcus Hook Terminal	240 cf/hr	Process Gas and Natural Gas
C02	East Cold Flare (New Tanks Project)	Flare	Flare Industries	Unknown	Marcus Hook Terminal	117 cf/hr	Process Gas and Natural Gas

VIA EMAIL

October 4, 2023

Mr. David Smith
Engineering Specialist
Pennsylvania Department of Environmental Protection
2 East Main Street
Norristown, PA 19401

Re: Energy Transfer Marketing & Terminals L.P. – Marcus Hook Terminal
Title V Operating Permit 23-00119
Addendum to RACT III Significant Operating Permit Modification Application

Dear Mr. Smith,

Energy Transfer Marketing & Terminals L.P. (Energy Transfer) hereby submits the attached Addendum to the RACT III Alternative Compliance Proposal and Signification Operating Permit Modification Application for the Marcus Hook Terminal previously submitted on December 20, 2022.

If you have any questions regarding this submittal, please feel free to contact me at 610-859-1279.

Sincerely,

Kevin Smith

Kevin W. Smith
Sr. Specialist – Environmental Compliance

2.1 RACT Analysis for the Refrigerated Propane Tanks

The Facility operates three refrigerated propane storage tanks: Source ID 102; Source ID 119; and Source ID 120. There are two sources of VOC emissions from these tanks: collected VOC emissions from operational, maintenance, and emergency vents; and fugitive emission leaks. The collected VOC emissions from these tanks are all currently controlled by the facility cold flares (Source IDs C01 and/or C02) to minimize VOC emissions. In addition, the tanks have fixed roofs and are equipped with vapor recovery systems which condense tank vapors to a liquid state before being hard piped back to the individual storage tanks. The fugitive emissions from these tanks are currently controlled by a Leak Detection and Repair (LDAR) Program. Section 2.1.1.1 through 2.1.1.3 below discusses VOC emissions from control devices (e.g., flares), and Section 2.2 of the application discusses VOC emissions from fugitive emission leaks (e.g., LDAR).

2.1.1 VOC Emissions from Flares

All three refrigerated propane storage tanks include operational, maintenance, and emergency connections to the facility cold flares (e.g., Source IDs C01 and C02) which results in VOC emissions. Flows to the flares from operational and/or maintenance are part of normal operation to prevent atmospheric releases and/or control process vessel pressure during abnormal high pressure. Operational flows are assumed to occur on a regular, routine, or continuous basis. Maintenance flows occur at varying intervals depending upon the maintenance schedule, operational schedule, and condition of the equipment. The flares also provide safe and reliable control and destruction of process gases during emergency situations. Emergency releases are not expected during normal operations, nor can these conditions be reasonably predicted.

Currently, all three tanks comply with New Source Performance Standards (NSPS) under 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. 40 CFR § 60.112b(a)(3) requires that each tank be equipped with a closed vent system and a control device.

2.1.1.1 Step 1 – Identify Available Control Technologies

Energy Transfer conducted a search of the USEPA's RACT/BACT/LAER Clearinghouse (RBLC) database to identify available control technologies for controlling collected VOC emissions. Process codes 19.33 (Refinery Flares), 19.39 (Other Flares), and 50.008 (Petroleum Refining Flares and Incinerators) were reviewed. Table 2.1 provides the complete list of RBLC IDs reviewed. Flares and thermal oxidizers were the only two technologies identified in these RBLC searches for reducing emissions of collected VOC emissions. Both control technologies are further discussed below.

Flares or flaring is a high-temperature oxidation process used to control VOC streams from industrial operations, and can typically handle large fluctuations in VOC concentration, flow rate, heating value, and inert species content. Flaring is appropriate for continuous, batch, and variable flow vent stream applications, but the primary use is that of a safety device used to control a large volume of pollutant resulting from upset conditions (EPA, 2003). There are two types of flares, elevated and ground flares. Elevated flares, the more common type, have larger capacities than ground flares. In elevated flares, a vent stream is fed through a stack anywhere from 10 to over 100 meters tall and is combusted at the tip of the stack. The flame is exposed to atmospheric disturbances such as wind and precipitation. In ground flares, combustion takes place at ground level. Ground flares vary in complexity, and they may consist either of conventional flare burners discharging horizontally with no enclosures or of multiple burners in refractory-lined steel enclosures. Properly operated flares can achieve a destruction efficiency of 98 percent or greater.

Thermal oxidizers also use a high-temperature oxidation process to control VOC streams from industrial operations. The design of a thermal oxidizer is dependent on the pollutant concentration in the waste gas stream, type of pollutant, presence of other gases, level of oxygen, stability of processes vented to the system, and degree of control required. Important design factors include temperature (a temperature high enough to ignite the organic constituents in the waste gas stream), residence time (sufficient time for the combustion reaction to occur), and turbulence or mixing of combustion air with the waste gas. Time, temperature, degree of mixing, and sufficient oxygen concentration governs the completeness of the combustion reaction. Thermal Oxidizers can handle minor fluctuations in flow; however, excess fluctuations require the use of a flare (EPA, 2003). VOC destruction efficiency depends upon design criteria but can achieve a destruction efficiency of 98 percent or greater.

2.1.1.2 Step 2 – Eliminate Technically Infeasible Options

Each of the refrigerated propane tanks includes emergency connections to the flares which can quickly generate large volumes of emissions during major upsets. Because thermal oxidizers require sufficient time for the combustion reaction to occur, thermal oxidizers cannot handle large fluctuations in flow. Elevated flares are the only control device that can handle both small quantities of flows during normal operation and large quantities during upset conditions. For these reasons, a thermal oxidizer is not considered a technically feasible option.

2.1.1.3 Step 5 – Proposed RACT

Energy Transfer is proposing to continue operating the closed vent systems and the two cold flares (e.g., Source IDs C01 and C02) as RACT for Source IDs 102, 119, and 120. Energy Transfer will operate the closed vent systems and flares in accordance with 40 CFR § 60.112b, §40 CFR 60.18, and good operating practices. Energy Transfer will demonstrate compliance with the proposed RACT requirements as described in Section 3.1 and by keeping the records described in Section 3.8.

References

EPA, 2003. U.S. EPA, Clean Air Technology Center, “Air Pollution Control Technology Fact Sheet – Thermal Incinerator,” EPA-452/F-03-022, Washington, D.C.

EPA, 2003. U.S. EPA, Clean Air Technology Center, “Air Pollution Control Technology Fact Sheet – Flare,” EPA-452/F-03-019, Washington, D.C.

Table 2.1

Company Name	RBLC ID	Permit Date	Process Type	Process Description
ANADARKO PETROLEUM CORPORATION	FL-0347	09/16/2014 ACT	19.39	Boom Flare
BILL GREEHEY REFINERY EAST PLA	TX-0936	03/29/2022 ACT	50.008	Thermal Oxidizers & Flares
BUCKEYE TEXAS PROCESSING CORPU	TX-0861	08/29/2019 ACT	19.33	Flare
CAMERON LNG FACILITY	LA-0316	02/17/2017 ACT	19.39	Flares (3 units)
CENTURION BROWNSVILLE	TX-0930	10/19/2021 ACT	19.33	Main Flare
CHANNELVIEW TERMINAL	TX-0835	04/13/2018 ACT	19.33	Process Vents to Flare
CONDENSATE SPLITTER FACILITY	TX-0872	10/31/2019 ACT	19.33	Flare (Routine and MSS)
CORPUS CHRISTI LIQUEFACTION PL	TX-0672	09/12/2014 ACT	19.39	Flares
COVE POINT LNG TERMINAL	MD-0044	06/09/2014 ACT	19.39	North & South Flare
CRUDE OIL PROCESSING FACILITY	TX-0812	10/31/2016 ACT	19.33	Refinery Flares
DRIFTWOOD LNG FACILITY	LA-0349	07/10/2018 ACT	19.39	Flares (9)
FREEPORT LNG LIQUEFACTION PLAN	TX-0677	07/16/2014 ACT	19.39	Flare
FREEPORT LNG PRETREATMENT FACI	TX-0678	07/16/2014 ACT	19.39	Flare
G2G PLANT	LA-0315	05/23/2014 ACT	19.39	Flare Pilot Burner
GAS TREATMENT PLANT	AK-0085	08/13/2020 ACT	19.39	Eight (8) Flares for Vent Gas Disposal
LAKE CHARLES CHEMICAL COMPLEX	LA-0371	11/07/2019 ACT	50.008	ALC Thermal Oxidizer
LIQUEFACTION PLANT	AK-0088	07/07/2022 ACT	19.39	Seven Flares for Vent Gas Disposal
MAGNOLIA LNG FACILITY	LA-0307	03/21/2016 ACT	19.39	Flares
MAGNOLIA LNG FACILITY	LA-0307	03/21/2016 ACT	50.008	Thermal Oxidizers (2 units)
MARCUS HOOK	PA-0324	02/12/2021 ACT	50.008	Project Phoenix Cold Flare
MONT BELVIEU NGL FRACTIONATION	TX-0886	03/31/2020 ACT	19.39	MSS Flare
NATURAL GAS FRACTIONATION	TX-0706	01/23/2014 ACT	19.39	Emergency Flare
ORANGE POLYETHYLENE PLANT	TX-0888	04/23/2020 ACT	19.39	Multipoint Ground Flare
ORANGE POLYETHYLENE PLANT	TX-0888	04/23/2020 ACT	50.008	Thermal Oxidizers
PORT ARTHUR ETHANE CRACKER UNI	TX-0876	02/06/2020 ACT	50.008	Thermal Oxidizers
PORT ARTHUR REFINERY	TX-0873	02/04/2020 ACT	19.33	Flare
RIVERVIEW ENERGY CORPORATION	IN-0317	06/11/2019 ACT	50.008	High Pressure Flare
ST. JAMES METHANOL PLANT	LA-0312	06/30/2017 ACT	19.39	Process Flare
SWEENY OLD OCEAN FACILITIES	TX-0928	10/15/2021 ACT	19.39	Flare
SWEENY REFINERY	TX-0903	09/09/2020 ACT	19.33	Flare
ZIA II GAS PLANT	NM-0052	04/25/2014 ACT	19.33	Refinery Flares

EPA-452/F-03-019

Air Pollution Control Technology Fact Sheet

Name of Technology: Flare

This includes elevated flares, steam-assisted flares, air-assisted flares, non-assisted flares, pressure-assisted flares, and enclosed ground flares.

Type of Technology: Destruction by thermal oxidation.

Applicable Pollutants: Volatile organic compounds (VOC), with the exception of halogenated compounds (EPA, 1995).

Achievable Emission Limits/Reductions:

VOC destruction efficiency depends upon an adequate flame temperature, sufficient residence time in the combustion zone, and turbulent mixing (EPA, 1992). A properly operated flare can achieve a destruction efficiency of 98 percent or greater when controlling emission streams with heat contents greater than 11 megajoules per standard cubic meter (MJ/sm^3) (300 British thermal units per standard cubic foot (Btu/scf)) (EPA, 1995; AWMA, 1992; EPA, 1992; EPA, 1991).

Applicable Source Type: Point

Typical Industrial Applications:

Flares can be used to control almost any VOC stream, and can typically handle large fluctuations in VOC concentration, flow rate, heating value, and inert species content. Flaring is appropriate for continuous, batch, and variable flow vent stream applications, but the primary use is that of a safety device used to control a large volume of pollutant resulting from upset conditions. Flares find their primary application in the petroleum and petrochemical industries. The majority of chemical plants and refineries have existing flare systems designed to relieve emergency process upsets that require release of large volumes of gas. These large diameter flares are designed to handle emergency releases, but can also be used to control vent streams from various process operations. Gases flared from refineries, petroleum production, and the chemical industry are composed largely of low molecular weight VOC and have high heating values. Flares used to control waste gases from blast furnaces consist of inert species and carbon monoxide with a low heating value. Gases flared from coke ovens are intermediate in composition to the other two groups and have a moderate heating value (EPA, 1995; EPA, 1992).

Emission Stream Characteristics:

a. **Air Flow:** The flow rate through the flare is dependent upon the properties of the waste gas stream and the configuration of the flare. Steam-, air-, and pressure-assisted flares add flow to the waste stream in order to improve flame stability. In cases where the heating value of the waste gas is too low or too high, auxiliary fuel or additional air must be added to the flow, respectively. The maximum flow through commercially available flares is about 500 standard cubic meters per second (sm^3/sec) (1,060,000 standard cubic feet per minute (scfm)), and the minimum can approach zero flow (EPA, 1995).

Attachment #5

b. **Temperature:** The discharge temperature is typically in the range of 500 to 1100°C (1000 to 2000°F), depending upon the composition of the waste gas flow (AWMA, 1992).

c. **Pollutant Loading:** Depending upon the type of flare configuration (e.g., elevated or ground flares) and the source of the waste stream, the capacity of flares to treat waste gases can vary up to about 50,000 kilograms per hour (kg/hr) (100,000 pounds per hour (lb/hr)) of hydrocarbon gases for ground flares and about 1 million kg/hr (2 million lb/hr) or more for elevated flares (EPA, 1991). Flares are not subject to the safety concern of incinerators regarding having a high concentration of organics in the waste gas. This is because flaring is an open combustion process and does not have an enclosed combustion chamber that can create an explosive environment. Incinerators, however, have an enclosed combustion chamber, which requires that the concentration of the waste gas be substantially below the lower flammable level (lower explosive limit, or LEL) of the specific compound being controlled to avoid the potential for explosion (as a rule, a safety factor of four (i.e., 25% of the LEL) is used).

d. **Other Considerations:** The waste gas stream must have a heating value of greater than 11 MJ/scm (300 Btu/scf). If this minimum is not met by the waste gas, auxiliary fuel must be introduced in sufficient quantity to make up the difference (EPA, 1995).

Emission Stream Pretreatment Requirements:

Liquids that may be in the vent stream gas or that may condense out in the collection header and transfer lines are removed by a knock-out drum. The knock-out or disentrainment drum is typically either a horizontal or vertical vessel located at or close to the base of the flare, or a vertical vessel located inside the base of the flare stack. Liquid in the vent stream can extinguish the flame or cause irregular combustion and smoking. In addition, flaring liquids can generate a spray of burning chemicals that could reach ground level and create a safety hazard (EPA, 1995).

Cost Information:

Typical elevated flares are primarily safety devices which prevent the emissions of large quantities of raw unburned hydrocarbons during plant upset conditions. The capital costs of elevated flare systems can range from $10,000 to $3,000,000, depending upon the application (Gonzalez, 1999). The controlling factors in the cost of the flare are the basic support structure of the flare, the size and height, and the auxiliary equipment. Other factors influencing the cost are the degree of sophistication desired (i.e., manual vs. automatic control) and the number of appurtenances selected, such as knock-out drums, seals, controls, ladders, and platforms. The minimum flare diameter is 2.5 centimeters (cm) (1 inch); the maximum flare diameter currently commercially available is 2.3 meters (90 inches). (EPA, 1996)

Operating costs for an elevated flare depend largely upon the design of the flare (e.g., a steam-assisted flare will require steam), the flow rate (this will determine the diameter of the flare tip), and the heating value of the gas to be controlled (this will be a factor in determining the height of the flare and the amount of auxiliary natural gas required to achieve the desired destruction temperature) (EPA, 1996).

The following are cost ranges (expressed in 2002 dollars) for elevated steam-assisted flares of conventional design under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996) and referenced to the volumetric flow rate of the waste stream treated. Costs were calculated for flares with tips between 2.5 cm (2 in) and 2.3 m (90 in) in diameter, burning 100 percent combustible waste gas (no air) with a heat content of approximately 4000 kcal/m^3 (450 Btu/scf), and operated between 1 and 100 hours per year. Flares in the lower end of the capital, operating &

maintenance, and annualized cost ranges have higher flow capacity (approximately 90 m^3/s or 190,000 scfm), with a flare tip diameter of up to 2.3 m (90 in), and operate 100 hours per year or more. The higher end of the cost ranges have lower flow capacity (approximately 0.01 m^3/s, or 24 scfm), flare tip diameters as small as 2.5 cm (1 inch), and operate fewer than ten hours per year.

Because flares are primarily safety devices which deal with flows of short duration (generally an upset condition or an accidental release from a process) rather than a control device which treats a continuous waste stream, it is not entirely appropriate to compare the cost effectiveness of flares to other control devices. Cost per ton of pollutant controlled largely depends upon the annual hours of operation. Infrequent use of the flare (approximately ten hours per year) will result in greater cost per ton of pollutant controlled., while more frequent use (approximately 100 hours per year) is represented by the lower costs per ton of pollutant controlled in the ranges presented below.

a. **Capital Cost:** \$27,000 to \$4,000,000 per sm^3/sec (\$13 to \$21,000 per scfm)

b. **O & M Cost:** \$2,000 to \$20,000 per sm^3/sec (\$1 to \$10 per scfm), annually

c. **Annualized Cost:** \$6,000 to \$650,000 per sm^3/sec (\$3 to \$300 per scfm), annually

d. **Cost Effectiveness:** \$17 to \$6,500 per metric ton (\$15 to \$5,800 per short ton), annualized cost per ton per year of pollutant controlled

Theory of Operation:

Flaring is a VOC combustion control process in which the VOC are piped to a remote, usually elevated, location and burned in an open flame in the open air using a specially designed burner tip, auxiliary fuel, and steam or air to promote mixing for nearly complete (> 98%) VOC destruction. Completeness of combustion in a flare is governed by flame temperature, residence time in the combustion zone, turbulent mixing of the gas stream components to complete the oxidation reaction, and available oxygen for free radical formation. Combustion is complete if all VOC are converted to carbon dioxide and water. Incomplete combustion results in some of the VOC being unaltered or converted to other organic compounds such as aldehydes or acids.

Flares are generally categorized in two ways: (1) by the height of the flare tip (i.e., ground or elevated), and (2) by the method of enhancing mixing at the flare tip (i.e., steam-assisted, air-assisted, pressure-assisted, or non-assisted). Elevating the flare can prevent potentially dangerous conditions at ground level where the open flame (i.e., an ignition source) is located near a process unit. Elevating the flare also allows the products of combustion to be dispersed above working areas to reduce the effects of noise, heat, smoke, and objectionable odors.

In most flares, combustion occurs by means of a diffusion flame. A diffusion flame is one in which air diffuses across the boundary of the fuel/combustion product stream toward the center of the fuel flow, forming the envelope of a combustible gas mixture around a core of fuel gas. This mixture, on ignition, establishes a stable flame zone around the gas core above the burner tip. This inner gas core is heated by diffusion of hot combustion products from the flame zone.

Cracking can occur with the formation of small hot particles of carbon that give the flame its characteristic luminosity. If there is an oxygen deficiency and if the carbon particles are cooled to below their ignition temperature, smoking occurs. In large diffusion flames, combustion product vortices can form around burning portions of the gas and shut off the supply of oxygen. This localized instability causes flame flickering, which can be accompanied by soot formation. As in all combustion processes, an adequate air supply and good mixing are required to complete combustion and minimize smoke. The various flare designs differ primarily in their accomplishment of mixing.

Steam-assisted flares are single burner tips, elevated above ground level for safety reasons, that burn the vented gas in a diffusion flame. They reportedly account for the majority of the flares installed and are the predominant flare type found in refineries and chemical plants. To ensure an adequate air supply and good mixing, this type of flare system injects steam into the combustion zone to promote turbulence for mixing and to induce air into the flame.

Some flares use forced air to provide the combustion air and the mixing required for smokeless operation. These flares are built with a spider-shaped burner (with many small gas orifices) located inside but near the top of a steel cylinder 0.6 meters (24 inches) or more in diameter. Combustion air is provided by a fan in the bottom of the cylinder. The amount of combustion air can be varied by varying the fan speed. The principal advantage of air-assisted flares is that they can be used where steam is not available. Although air assistance is not usually used on large flares (because it is generally not economical when the gas volume is large) the number of large air-assisted flares being built is increasing.

The non-assisted flare consists of a flare tip without any auxiliary provision for enhancing the mixing of air into its flame. Its use is limited to gas streams that have a low heat content and a low carbon/hydrogen ratio that burn readily without producing smoke. These streams require less air for complete combustion, have lower combustion temperatures that minimize cracking reactions, and are more resistant to cracking.

Pressure-assisted flares use the vent stream pressure to promote mixing at the burner tip. Several vendors now market proprietary, high pressure drop burner tip designs. If sufficient vent stream pressure is available, these flares can be applied to streams previously requiring steam or air assist for smokeless operation. Pressure-assisted flares generally (but not necessarily) have the burner arrangement at ground level, and consequently, must be located in a remote area of the plant where there is plenty of space available. They have multiple burner heads that are staged to operate based on the quantity of gas being released. The size, design, number, and group arrangement of the burner heads depend on the vent gas characteristics.

An enclosed flare's burner heads are inside a shell that is internally insulated. The shell reduces noise, luminosity, and heat radiation and provides wind protection. Enclosed, or ground-based flares are generally used instead of elevated flares for aesthetic or safety reasons. A high nozzle pressure drop is usually adequate to provide the mixing necessary for smokeless operation and air or steam assistance is not required. In this context, enclosed flares can be considered a special class of pressure-assisted or non-assisted flares. The height must be adequate for creating enough draft to supply sufficient air for smokeless combustion and for dispersion of the thermal plume. These flares are always at ground level.

Enclosed flares generally have less capacity than open flares and are used to combust continuous, constant flow vent streams, although reliable and efficient operation can be attained over a wide range of design capacity. Stable combustion can be obtained with lower heat content vent gases than is possible with open flare designs (1.9 to 2.2 MJ/sm^3 (50 to 60 Btu/scf)), probably due to their isolation from wind effects. Enclosed flares are typically used at landfills to destroy landfill gas. (EPA, 1995)

Advantages:

Advantages of flares over other types of VOC oxidizers include (EPA, 1992; EPA, 1991):

1. Can be an economical way to dispose of sudden releases of large amounts of gas;
2. In many cases do not require auxiliary fuel to support combustion; and
3. Can be used to control intermittent or fluctuating waste streams.

12. Disadvantages:

Disadvantages of flares include (EPA, 1995):

d. Can produce undesirable noise, smoke, heat radiation, and light;
e. Can be a source of SO_x, NO_x, and CO;
f. Cannot be used to treat waste streams with halogenated compounds; and
g. Released heat from combustion is lost.

Other Considerations:

Flaring is considered as a control option when the heating value of the emission stream cannot be recovered because of uncertain of intermittent flow as in process upsets of emergencies. If the waste gas has a heating value high enough to sustain combustion (i.e. greater than 11 MJ/sm^3 or 300 Btu/scf), the stream may serve as a fuel gas for an incinerator if one is employed at the site (EPA, 1991).

References:

AWMA, 1992. Air & Waste Management Association, Air Pollution Engineering Manual. Van Nostrand Reinhold, New York.

EPA, 1991. U.S. EPA, Office of Research and Development, "Control Technologies for Hazardous Air Pollutants," EPA/625/6-91/014, Washington, D.C., June.

EPA, 1992. U.S. EPA, Office of Air Quality Planning and Standards, "Control Techniques for Volatile Organic Emissions from Stationary Sources," EPA-453/R-92-018, Research Triangle Park, NC., December.

EPA, 1995. U.S. EPA, Office of Air Quality Planning and Standards, "Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams," EPA-456/R-95-003, Research Triangle Park, NC., May.

EPA, 1996. U.S. EPA, Office of Air Quality Planning and Standards, "OAQPS Control Cost Manual," Fifth Edition, EPA 453/B-96-001, Research Triangle Park, NC. February.

Gonzalez, 1999. Steve Gonzalez, Kaldair, Inc., Houston, Texas, (800) 525-3247, personal communications with Eric Albright, April 15 and 16, 1999.

EPA-452/F-03-022

Air Pollution Control Technology
Fact Sheet

Name of Technology: Thermal Incinerator

This type of incinerator is also referred to as a direct flame incinerator, thermal oxidizer, or afterburner. However, the term afterburner is generally appropriate only to describe a thermal oxidizer used to control gases coming from a process where combustion is incomplete.

Type of Technology: Destruction by thermal oxidation

Applicable Pollutants: Primarily volatile organic compounds (VOC). Some particulate matter (PM), commonly composed as soot (particles formed as a result of incomplete combustion of hydrocarbons (HC), coke, or carbon residue) will also be destroyed in various degrees.

Achievable Emission Limits/Reductions:

VOC destruction efficiency depends upon design criteria (i.e., chamber temperature, residence time, inlet VOC concentration, compound type, and degree of mixing) (EPA, 1992). Typical thermal incinerator design efficiencies range from 98 to 99.99% and above, depending on system requirements and characteristics of the contaminated stream (EPA, 1992; EPA, 1996a). The typical design conditions needed to meet 98% or greater control or a 20 parts per million by volume (ppmv) compound exit concentration are: 870°C (1600°F) combustion temperature, 0.75 second residence time, and proper mixing. For halogenated VOC streams, 1100°C (2000°F) combustion temperature, 1.0 second residence time, and use of an acid gas scrubber on the outlet is recommended (EPA, 1992).

For vent streams with VOC concentration below approximately 2000 ppmv, reaction rates decrease, maximum VOC destruction efficiency decreases, and an incinerator outlet VOC concentration of 20 ppmv, or lower may be achieved (EPA, 1992).

Controlled emissions and/or efficiency test data for PM in incinerators are not generally available in the literature. Emission factors for PM in phthalic anhydride processes with incinerators are available, however. The PM control efficiencies for these processes were found to vary from 79 to 96% (EPA, 1998). In EPA's 1990 National Inventory, incinerators used as control devices for PM were reported as achieving 25 to 99% control efficiency of particulate matter 10 microns or less in aerodynamic diameter (PM_{10}) at point source facilities (EPA, 1998). Table 1 presents a breakdown of the PM_{10} control efficiency ranges by industry for recuperative incinerators (EPA, 1996b). The VOC control efficiency reported for these devices ranged from 0 to 99.9%. These ranges of control efficiencies are large because they include facilities that do not have VOC emissions and control only PM, as well as facilities which have low PM emissions and are primarily concerned with controlling VOC (EPA, 1998).

Attachment #6

Table 1. Thermal Incinerator PM_{10} Destruction Efficiencies by Industry (EPA, 1996b)

Industry/Types of Sources	PM_{10} Control Efficiency (%)
Petroleum and Coal Products asphalt roofing processes (blowing, felt saturation); mineral calcining; petroleum refinery processes (asphalt blowing, catalytic cracking, coke calcining, sludge converter); sulfur manufacturing	25 - 99.9
Chemical and Allied Products carbon black manufacturing (mfg); charcoal mfg; liquid waste disposal; miscellaneous chemical mfg processes; pesticide mfg; phthalic anhydride mfg (xylene oxidation); plastics/synthetic organic fiber mfg; solid waste incineration (industrial)	50 - 99.9
Primary Metals Industries by-product coke processes (coal unloading, oven charging and pushing, quenching); gray iron cupola and other miscellaneous processes; secondary aluminum processes (burning/drying, smelting furnace); secondary copper processes (scrap drying, scrap cupola, and miscellaneous processes); steel foundry miscellaneous processes; surface coating oven	70 - 99.9
Electronic and Other Electric Equipment chemical mfg miscellaneous processes; electrical equipment bake furnace; fixed roof tank; mineral production miscellaneous processes; secondary aluminum roll/draw extruding; solid waste incineration (industrial)	70 - 99.9
Electric, Gas, and Sanitary Services internal combustion engines; solid waste incineration (industrial, commercial/ institutional)	90 - 98
Stone, Clay, and Glass Products barium processing kiln; coal cleaning thermal dryer; fabricated plastics machinery; wool fiberglass mfg	50 - 95
Food and Kindred Products charcoal processing, miscellaneous; corn processing, miscellaneous, fugitive processing, miscellaneous; soybean processing, miscellaneous	70 - 98
Mining asphalt concrete rotary dryer; organic chemical air oxidation units, sulfur production	70 - 99.6
National Security and International Affairs solid waste incineration (commercial/institutional and municipal)	70
Textile Mill Products plastics/synthetic organic fiber (miscellaneous processes)	88 - 95
Industrial Machinery and Equipment secondary aluminum processes (burning/drying, smelt furnace)	88 -98
Lumber and Wood Products solid waste incineration (industrial)	70
Transportation Equipment solid waste incineration (industrial)	70 - 95

Applicable Source Type: Point

Typical Industrial Applications:

Thermal incinerators can be used to reduce emissions from almost all VOC sources, including reactor vents, distillation vents, solvent operations, and operations performed in ovens, dryers, and kilns. They can handle minor fluctuations in flow, however, excess fluctuations require the use of a flare (EPA, 1992). Their fuel consumption is high, so thermal units are best suited for smaller process applications with moderate-to-high VOC loadings.

Incinerators are used to control VOC from a wide variety of industrial processes, including, but not limited to the following (EPA, 1992):

- Storing and loading/unloading of petroleum products and other volatile organic liquids;
- Vessel cleaning (rail tank cars and tank trucks, barges);
- Process vents in the synthetic organic chemical manufacturing industry (SOCMI);
- Paint manufacturing;
- Rubber products and polymer manufacturing;
- Plywood manufacturing;
- Surface coating operations:
  Appliances, magnetic wire, automobiles, cans, metal coils, paper, film and foil, pressure sensitive tapes and labels, magnetic tape, fabric coating and printing, metal furniture, wood furniture, flatwood paneling, aircraft, miscellaneous metal products;
- Flexible vinyl and urethane coating;
- Graphic arts industry; and
- Hazardous waste treatment storage, and disposal facilities (TSDFs).

Emission Stream Characteristics:

a. **Air Flow:** Typical gas flow rates for thermal incinerators are 0.24 to 24 standard cubic meters per second (sm^3/sec) (500 to 50,000 standard cubic feet per minute (scfm)) (EPA, 1996a).

b. **Temperature:** Most incinerators operate at higher temperatures than the ignition temperature, which is a minimum temperature. Thermal destruction of most organic compounds occurs between 590°C and 650°C (1100°F and 1200°F). Most hazardous waste incinerators are operated at 980°C to 1200°C (1800°F to 2200°F) to ensure nearly complete destruction of the organics in the waste (AWMA, 1992).

a. **Pollutant Loading:** Thermal incinerators can be used over a fairly wide range of organic vapor concentrations. For safety considerations, the concentration of the organics in the waste gas must be substantially below the lower flammable level (lower explosive limit, or LEL) of the specific compound being controlled. As a rule, a safety factor of four (i.e., 25% of the LEL) is used (EPA, 1991, AWMA, 1992). The waste gas may be diluted with ambient air, if necessary, to lower the concentration. Considering economic factors, thermal incinerators perform best at inlet concentrations of around 1500 to 3000 ppmv, because the heat of combustion of hydrocarbon gases is sufficient to sustain the high temperatures required without addition of expensive auxiliary fuel (EPA, 1995).

d. **Other Considerations:** Incinerators are not generally recommended for controlling gases containing halogen- or sulfur-containing compounds, because of the formation of hydrogen chloride, hydrogen fluoride gas, sulfur dioxide, and other highly corrosive acid gases. It may be necessary to install a post-oxidation acid gas treatment system in such cases, depending on the outlet concentration. This would likely make incineration an uneconomical option. (EPA, 1996a). Thermal incinerators are also not generally cost-effective for low-concentration, high-flow organic vapor streams (EPA, 1995).

Emission Stream Pretreatment Requirements:

Typically, no pretreatment is required, however, in some cases, a concentrator (e.g., carbon or zeolite adsorption) may be used to reduce the total gas volume to be treated by the more expensive incinerator.

Cost Information:

The following are cost ranges (expressed in 2002 dollars) for packaged thermal incinerators of conventional design under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996a) and referenced to the volumetric flow rate of the waste stream treated. The costs do not include costs for a post-oxidation acid gas treatment system. Costs can be substantially higher than in the ranges shown when used for low to moderate VOC concentration streams (less than around 1000 to 1500 ppmv). As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow. Operating and Maintenance (O & M) Costs, Annualized Cost, and Cost Effectiveness are dominated by the cost of supplemental fuel required.

a. **Capital Cost:** \$53,000 to \$190,000 per sm^3/sec (\$25 to \$90 per scfm)

b. **O & M Cost:** \$11,000 to \$160,000 per sm^3/sec (\$5 to \$75 per scfm), annually

c. **Annualized Cost:** \$17,000 to \$208,000 per sm^3/sec (\$8 to \$98 per scfm), annually

d. **Cost Effectiveness:** \$440 to \$3,600 per metric ton (\$400 to \$3,300 per short ton), annualized cost per ton per year of pollutant controlled

Theory of Operation:

Incineration, or thermal oxidation is the process of oxidizing combustible materials by raising the temperature of the material above its auto-ignition point in the presence of oxygen, and maintaining it at high temperature for sufficient time to complete combustion to carbon dioxide and water. Time, temperature, turbulence (for mixing), and the availability of oxygen all affect the rate and efficiency of the combustion process. These factors provide the basic design parameters for VOC oxidation systems (ICAC, 1999).

A straight thermal incinerator is comprised of a combustion chamber and does not include any heat recovery of exhaust air by a heat exchanger (this type of incinerator is referred to as a recuperative incinerator).

The heart of the thermal incinerator is a nozzle-stabilized flame maintained by a combination of auxiliary fuel, waste gas compounds, and supplemental air added when necessary. Upon passing through the flame, the waste gas is heated from its preheated inlet temperature to its ignition temperature. The ignition temperature varies for different compounds and is usually determined empirically. It is the temperature at which the combustion reaction rate exceeds the rate of heat losses, thereby raising the temperature of the gases to some higher value. Thus, any organic/air mixture will ignite if its temperature is raised to a sufficiently high level (EPA, 1996a).

The required level of VOC control of the waste gas that must be achieved within the time that it spends in the thermal combustion chamber dictates the reactor temperature. The shorter the residence time, the higher the reactor temperature must be. The nominal residence time of the reacting waste gas in the combustion chamber is defined as the combustion chamber volume divided by the volumetric flow rate of the gas. Most thermal units are designed to provide no more than 1 second of residence time to the waste gas with typical temperatures of 650 to 1100°C (1200 to 2000°F). Once the unit is designed and built, the residence time is not easily changed, so that the required reaction temperature becomes a function of the particular gaseous species and the desired level of control (EPA, 1996a).

Studies based on actual field test data, show that commercial incinerators should generally be run at 870°C (1600°F) with a nominal residence time of 0.75 seconds to ensure 98% destruction of non-halogenated organics (EPA, 1992).

Advantages:

Incinerators are one of the most positive and proven methods for destroying VOC, with efficiencies up to 99.9999% possible. Thermal incinerators are often the best choice when high efficiencies are needed and the waste gas is above 20% of the LEL.

Disadvantages:

Thermal incinerator operating costs are relatively high due to supplemental fuel costs.

Thermal incinerators are not well suited to streams with highly variable flow because of the reduced residence time and poor mixing during increased flow conditions which decreases the completeness of combustion. This causes the combustion chamber temperature to fall, thus decreasing the destruction efficiency (EPA, 1991).

Incinerators, in general, are not recommended for controlling gases containing halogen- or sulfur-containing compounds because of the formation of highly corrosive acid gases. It may be necessary to install a post-oxidation acid gas treatment system in such cases, depending on the outlet concentration (EPA, 1996a). Thermal incinerators are also not generally cost-effective for low-concentration, high-flow organic vapor streams (EPA, 1995).

Other Considerations:

Thermal incinerators are not usually as economical, on an annualized basis, as recuperative or regenerative incinerators because they do not recover waste heat energy from the exhaust gases. This heat can be used to preheat incoming air, thus reducing the amount of supplemental fuel required. If there is additional heat energy available, it can be used for other process heating needs.

References:

AWMA, 1992. Air & Waste Management Association, Air Pollution Engineering Manual. Van Nostrand Reinhold, New York.

EPA, 1991. U.S. EPA, Office of Research and Development, “Control Technologies for Hazardous Air Pollutants,” EPA/625/6-91/014, Washington, D.C., June.

EPA, 1992. U.S. EPA, Office of Air Quality Planning and Standards, “Control Techniques for Volatile Organic Emissions from Stationary Sources,” EPA-453/R-92-018, Research Triangle Park, NC., December.

EPA, 1995. U.S. EPA, Office of Air Quality Planning and Standards, “Survey of Control Technologies for Low Concentration Organic Vapor Gas Streams,” EPA-456/R-95-003, Research Triangle Park, NC., May.

EPA, 1996a. U.S. EPA, Office of Air Quality Planning and Standards, “OAQPS Control Cost Manual,” Fifth Edition, EPA 453/B-96-001, Research Triangle Park, NC. February.

EPA, 1996b. U.S. EPA, “1990 National Inventory,” Research Triangle Park, NC, January.

EPA, 1998. U.S. EPA, Office of Air Quality Planning and Standards, “Stationary Source Control Techniques Document for Fine Particulate Matter,” EPA-452/R-97-001, Research Triangle Park, NC., October.

ICAC, 1999. Institute of Clean Air Companies internet web page www.icac.com, Control Technology Information - Thermal Oxidation, page accessed March 1999.