MPLX

**MPLX Terminals LLC**

539 South Main Street
Findlay, OH 45840

September 23, 2019

Ms. Laura M. Crowder
Director, Division of Air Quality
WV Department of Environmental Protection (WVDEP)
Division of Air Quality
601 - 57th Street
Charleston, WV 25304



*RE:* ***MPLX Terminals LLC – Kenova, West Virginia***
***Facility ID No. 099-00022 (Kenova-TriState)***
***Title V Operating Permit Renewal Application***

Dear Ms. Crowder:

MPLX Terminals LLC (MPLXT) owns and operates a bulk gasoline terminal in Kenova, West Virginia. The Kenova-TriState Terminal currently operates under West Virginia Permit to Operate R30-09900022-2015, effective April 7, 2015.

The operating permit for the Kenova-TriState Terminal expires on March 24, 2020, and a renewal application is due by September 24, 2019. MPLXT is requesting a renewal of the Title V Operating Permit in accordance with Title 45, Legislative Rule of the Division of Air Quality (DAQ) Series (CSR) 30-4.1.a.3.

MPLXT requests a face-to-face meeting with WVDEP in the coming weeks in order to review the permit application with the agency. In particular, MPLXT took an abundantly conservative approach and included dockside barge emissions in this application. MPLXT would like to discuss the applicability for these emissions with the agency.

## Request for Voluntary Restriction (45CSR30-12.7)

Pursuant to 45CSR30-12.7, MPLXT is requesting incorporation into the Title V permit of a voluntary operational restriction to require the capture and control of dockside barge arrival depressurization emissions to the existing VRU.[1] The requested restriction allows MPLXT to account for controlled arrival emissions when evaluating potential to emit; however, incorporation of this voluntary capture/control requirement does not impact the major source status of the facility.

[1] Note that the sampling/gauging evaporation emissions and dockside departure depressurization emissions will not be captured and controlled.

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Should you have any questions concerning this application or the information provided herein, please contact Mr. Greg Moore at (419) 421-3774.

Sincerely,

HRE X Angela Brown

Angela Brown
Vice President
MPLX Terminals LLC

*Section 6: Certification of Information*

| 28. Certification of Truth, Accuracy and Completeness and Certification of Compliance |
|---|
| *Note: This Certification must be signed by a responsible official. The **original**, signed in **blue ink**, must be submitted with the application. Applications without an **original** signed certification will be considered as incomplete.* |
| **a. Certification of Truth, Accuracy and Completeness**<br><br>I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment. |
| **b. Compliance Certification**<br><br>Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements. |

| **Responsible official (type or print)** | |
|---|---|
| Name: Angela Brown | Title: Vice President |
| **Responsible official's signature:**<br>Signature: Angela Brown (Must be signed and dated in blue ink) | Signature Date: Sept 23, 2019 |

| Note: Please check all applicable attachments included with this permit application: | |
|---|---|
| ☒ | ATTACHMENT A: Area Map |
| ☒ | ATTACHMENT B: Plot Plan(s) |
| ☒ | ATTACHMENT C: Process Flow Diagram(s) |
| ☒ | ATTACHMENT D: Equipment Table |
| ☒ | ATTACHMENT E: Emission Unit Form(s) |
| ☐ | ATTACHMENT F: Schedule of Compliance Form(s) |
| ☒ | ATTACHMENT G: Air Pollution Control Device Form(s) |
| ☒ | ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s) |

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SEP 24 2019
WV DEP / DIV OF AIR QUALITY

***All of the required forms and additional information can be found and downloaded from, the DEP website at* www.dep.wv.gov/daq*, requested by phone (304) 926-0475, and/or obtained through the mail.***

# TITLE V PERMIT RENEWAL APPLICATION

## MPLX Terminals LLC
## Kenova-TriState Terminal

MPLX Terminals LLC
A subsidiary of Marathon Petroleum Corporation

Prepared By:

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September 2019

Project 193601.0135

Trinity Consultants

*Environmental solutions delivered uncommonly well*

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# 1. INTRODUCTION

MPLX Terminals LLC (MPLXT) owns and operates a bulk gasoline terminal in Kenova, West Virginia (WV). The Kenova-Tristate Terminal currently operates under West Virginia Permit to Operate R30-09900022-2015, effective April 7, 2015.

The operating permit for the Kenova-TriState Terminal expires on March 24, 2020, and a renewal application is due by September 24, 2019. This document is being submitted as the timely renewal application for the Kenova-TriState Terminal.

## 1.1. FACILITY DESCRIPTION

The Kenova-TriState Terminal is located at 23rd Street and the Ohio River, Kenova, West Virginia, 25530, in Wayne County. The oil transfer dock is located at Ohio River Mile Marker 316.3 on the Left Descending Bank. The Kenova-TriState Terminal receives refined petroleum fuels, primarily gasoline and distillate (which may refer to kerosene, jet kerosene, or fuel oil #2) from Marathon Petroleum Company's Catlettsburg, Kentucky, refinery via pipeline.[1] Fuels can be transferred from both tank farms to the oil transfer dock. Towboats are also fueled at the oil transfer dock. However, neither trucks nor railcars are loaded or unloaded at this facility. Off-loading of barges also occurs occasionally. The Kenova-TriState Terminal is also the source for product to the Cardinal Pipeline, which is a 16" pipeline connecting the Kenova-TriState Terminal with MPLXT's terminal in Columbus, Ohio. The Kenova-TriState Terminal has twenty-three (23) above-ground commodity storage tanks located in the Kenova and TriState tank farms. Currently, the facility is undergoing construction of a butane tanker truck unloading, storage, and blending operation for which MPLXT submitted an off permit change on December 21, 2018.

In addition to the operations listed above, MPLXT utilizes ancillary emission units to support and facilitate facility operations (e.g., internal combustion engines, hot oil heater, oily sewer system, etc.) Detailed information for these units is included in the emission unit forms provided under Attachment E to this application.

Area maps and plot plans of the Kenova-TriState Terminal are provided in Attachments A and B respectively. A process flow diagram depicting facility operations is provided in Attachment C.

## 1.2. APPLICATION UPDATES

The following list identifies changes to the site or to the application since the last renewal application was submitted in 2014:

- The emergency fire/water pump (Engine #1) was replaced with larger emergency fire/water pump (proposed ID Engine #4).
- The emergency office backup generator (Engine #2) and emergency tank farm backup generator (Engine #3) were permanently removed from service at the facility.
- MPLXT installed a new non-emergency backup engine for the Kenova tank farm wastewater (proposed ID Engine #5).
- MPLXT submitted two (2) Title V off permit changes to authorize operation of a pipeline bladder surge tank and to authorize operation of equipment associated with butane receiving, storage, and blending activities. Note that MPLXT commenced construction of the new equipment, but has not yet commenced operation. Therefore, this equipment is not yet included on the plot plan.

[1] Neither the Kenova Terminal nor the Tri-State Terminal is adjacent to or contiguous with the Catlettsburg Refinery (i.e., the refinery is a different stationary source).

- MPLXT incorporated potential emission calculations for the following existing sources of emissions not previously accounted for in a Title V application or as part of the facility-wide potential emissions:
  - Dockside barge arrival and departure gauging/sampling emissions
    - Pursuant to 45CSR30-12.7, MPLXT is requesting a voluntary operational restriction in the Title V permit requiring capture and control of the dock arrival depressurization emissions using the existing VRU. Note that the sampling/gauging evaporation and dock departure depressurization emissions are not controlled by the VRU.
  - Planned floating roof tank cleaning emissions
    - These emissions occur infrequently (e.g., once every 20 years for most floating roof tanks), and not all floating roof tanks will be landed/cleaned in the same calendar year.
- Updates to the potential emission calculations to include the dockside barge arrival and departure emissions indicate that the facility-wide hazardous air pollutant (HAP) emissions are now greater than the HAP major source thresholds (25 tpy for total HAP and 10 tpy for individual HAP). As MPLXT already complies with MACT-level standards for the barge loading operation, only ancillary emission units (e.g., heater, emergency engine) are impacted by this change as described in Section 2.4.

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## 1.3. TITLE V RENEWAL APPLICATION ORGANIZATION

This Title V permit application is organized as follows:

- Section 2 contains an overview of regulatory applicability for the Kenova-TriState Terminal;
- Section 3 contains sample emission source calculations;
- Section 4 contains the required WVDEP application forms;
- Attachment A contains an area map;
- Attachment B contains a plot plan;
- Attachment C contains a process flow diagram;
- Attachment D contains the WVDEP Title V equipment table;
- Attachment E contains a WVDEP emission unit form for the emission units at the Kenova-TriState Terminal;
- Attachment F contains a schedule of compliance form (if applicable);
- Attachment G contains a WVDEP control device form for each control device at the Kenova-TriState Terminal;
- Attachment H addresses compliance assurance monitoring requirements (if applicable); and
- Attachment I contains site-wide emission calculations.

# 2. REGULATORY APPLICABILITY

A key objective of a Title V operating permit application is to compile all applicable Clean Air Act-derived requirements into one document. The requirements can be categorized as (1) emission limits and work practice standards, and (2) testing, monitoring, recordkeeping, and reporting requirements. To compile a list of the requirements applicable to a facility, it is first necessary to determine which Federal and State air regulations apply to the facility as a whole, or to individual emission units. This section documents the applicability determinations made for Federal and State air quality regulations. Regulations potentially applicable to MPLXT are detailed in the "*Applicable Requirements*" sections of the forms provided by the WVDEP contained in Section 4 of this report.

The remainder of this section summarizes the air permitting requirements and key air quality regulations that apply to the operation of the Kenova-TriState Terminal. Applicability or non-applicability of the following regulatory programs is addressed:

- Prevention of Significant Deterioration (PSD) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP);
- Compliance Assurance Monitoring (CAM);
- Risk Management Plan (RMP);
- Stratospheric Ozone Protection; and
- West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP Title V application forms, which fulfill the requirement to include citations and descriptions of applicable statutory and administrative code requirements.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the Kenova-TriState Terminal. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the Kenova-TriState Terminal. Regulations that are categorically non-applicable are not discussed.

## 2.1. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) SOURCE CLASSIFICATION

Federal construction permitting programs regulate new sources of attainment pollutants under PSD and new sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). Wayne County has been designated "in attainment" or "unclassifiable" with respect to National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.[2] Petroleum storage and transfer units with a total storage capacity exceeding three hundred thousand barrels are classified as one of the 28 listed source categories in 40 CFR 52.21(b)(1)(i)(a), and are therefore subject to the PSD major source threshold of 100 tpy. The Kenova-TriState Terminal is an existing major source with regard to PSD with facility-wide potential emissions of VOC in excess of 100 tpy.

The applicability of NNSR is evaluated for proposed construction, reconstruction, and modification projects that result in an emissions increase of a regulated NSR pollutant for which the area is not attaining the NAAQS. As previously stated, Wayne County is "in attainment" or "unclassifiable" for all regulated NSR pollutants, and the Kenova-TriState Terminal is therefore not subject to NNSR.

[2] Attainment designations for West Virginia counties are established in 40 CFR 81.349.

## 2.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in 45CSR30. The major source potential-to-emit thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants.

As shown in Attachment I, total potential emissions from the facility exceed the major source thresholds for VOC and HAP; therefore, a Title V operating permit is required. The Kenova-TriState Terminal currently operates under TV operating permit 09900022-2015, effective April 7, 2015. This timely and complete renewal application is being submitted by the renewal deadline of September 24, 2019, (i.e., six months prior to the expiration of the Kenova-TriState Terminal's Title V operating permit) in accordance with 45CSR30-4.1.a.3.

## 2.3. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources in specific source categories to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the Kenova-TriState Terminal.

### 2.3.1. NSPS Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

The affected source under 40 CFR 60, Subpart Dc (NSPS Dc) is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989, and that has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. NSPS Dc contains emission standards for $SO_2$ and PM.

As provided in 40 CFR 60.41c, a steam-generating unit is defined as:

> *…a device that combusts any fuel and produces steam or heats water or any other heat transfer medium. This term includes any duct burner that combusts fuel and is part of a combined cycle system. This term does not include process heaters as defined in this subpart.*

The hot oil heater has a heat input capacity of 2.499 MMBtu/hr. Because NSPS Dc does not apply to units with design heat input capacities of less than 10 MMBtu/hr, the provisions of NSPS Dc do not apply to the hot oil heater at the Kenova-TriState Terminal.

### NSPS Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels)

NSPS Subpart Kb applies to storage vessels with a capacity greater than or equal to 75 $m^3$ (~19,800 gallons) that are used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. The rule exempts certain storage vessels larger than 75 $m^3$ that store materials with maximum true vapor pressure below certain limits.[3] Several storage tanks at the Kenova-TriState Terminal are subject to this Subpart, based on capacity and the types of materials being stored. The applicability of NSPS Kb to each storage tank is indicated on the Emission Unit form for each tank, included in Attachment E of this document. All tanks that are subject to this rule are, and will continue to be, operated in compliance with all applicable requirements.

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[3] Item 19 in the General Form immediately following this application narrative identifies tanks to which the provisions of NSPS Kb do not apply and includes the relevant citation.

### 2.3.2. NSPS Subpart XX – Standards of Performance for Bulk Gasoline Terminals

NSPS Subpart XX applies to gasoline loading to gasoline tank trucks. This rule is not applicable to the Kenova-TriState Terminal, because the facility does not operate gasoline tank truck loading racks.

### 2.3.3. NSPS Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Affected sources under NSPS IIII include compression ignition internal combustion engines. MPLXT operates one 510 brake horsepower (bhp) diesel-fired emergency fire pump that was manufactured and installed after July 1, 2006, and is therefore subject to the provisions of NSPS IIII per 40 CFR 60.4200(a)(2)(ii). MPLXT also operates a 66 hp diesel fired engine that was manufactured and installed after April 1, 2006, and is therefore subject to the provisions of NSPS IIII per 40 CFR 60.4200(a)(2)(i). MPLXT purchased the emergency fire pump engine certified to meet the emission standards in Table 4 of NSPS IIII pursuant to 40 CFR 60.4205(c), and MPLXT purchased the non-emergency engine certified to meet Tier 4 emission standards pursuant to 60.4201(a). MPLXT operates and maintains these engines in accordance with the requirements of Subpart IIII.

### 2.3.4. NSPS Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Affected sources under NSPS JJJJ include spark ignition internal combustion engines. The propane-fired emergency backup generators at the terminal were removed from the terminal. Therefore, NSPS JJJJ no longer applies.

## 2.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

40 CFR Part 61 and 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP.

As noted in Section 1.2 above, MPLXT revised the facility-wide potential emissions to incorporate dock arrival and dock departure barge gauging/sampling emissions. When considering these emissions as a part of the facility-wide potential emissions, the Kenova-TriState Terminal has the potential to emit total and individual HAP in quantities greater than 25 and 10 tpy respectively. Therefore, upon submittal of this renewal application, the facility will be considered a major source of HAP. The following section of this report provides applicability determinations for each of the NESHAP standards to which the facility is potentially subject.

### 2.4.1. Part 61 NESHAP Subpart M – National Emission Standard for Asbestos

NESHAP Subpart M includes standards and requirements for facilities related to the safe handling of asbestos containing materials. This rule is generally applicable to the Kenova-TriState Terminal. MPLXT will continue to meet all applicable requirements of this rule.

### 2.4.2. Part 61 NESHAP Subpart BB – National Emission Standard for Benzene Emissions from Benzene Transfer Operations

NESHAP Subpart BB includes standards and requirements for facilities related to the safe handling of benzene containing materials and specifically applies to loading racks at which benzene is loaded into tank trucks, railcars, or marine vessels at benzene production facilities and bulk terminals. However, as provided in 40 CFR 61.300(a), the loading of gasoline, crude oil, natural gas liquids, and petroleum distillates (e.g., fuel oil, diesel, or kerosene) are specifically exempted from the regulation; therefore, 40 CFR 61, Subpart BB does not apply to the Kenova-TriState Terminal.

### 2.4.3. Part 63 NESHAP Subpart R – National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)

NESHAP Subpart R applies to bulk gasoline terminals and pipeline breakout stations. MPLXT must comply with NSPS Kb for gasoline storage vessels and the equipment leak standards of Subpart R for valves, pumps, and fittings/connectors in gasoline service. MPLXT is operating, and will continue to operate, the Kenova-TriState Terminal in accordance with the requirements of this rule.

MPLXT does not operate a truck or railcar loading rack; therefore, the Subpart R requirements applicable to truck or railcar loading racks do not apply to the Kenova-TriState Terminal.

### 2.4.4. Part 63 NESHAP Subpart Y – National Emission Standards for Marine Tank Vessel Loading Operations

NESHAP Subpart Y applies to marine vessel loading operations at major sources of HAP. The Kenova-TriState Terminal operates existing marine vessel loading operations; therefore, this rule is applicable to the gasoline barge loading operations. MPLXT is operating, and will continue to operate, all marine tank vessel loading facilities in accordance with the requirements of this rule, as applicable.

As noted in Section 1.2, MPLXT has incorporated dockside barge arrival and departure gauging/sampling emissions. Subpart Y is not applicable to these dockside emissions that do not occur during gasoline loading.

The unit-specific forms for Gasoline Loading Operations included in Attachment E to this application outline the specific applicable requirements of 40 CFR 63, Subpart Y.

### 2.4.5. Part 63 NESHAP Subpart EEEE – Organic Liquids Distribution (Non-gasoline)

NESHAP Subpart EEEE applies to major sources of HAP that operate organic liquid distribution (OLD) (non-gasoline) facilities. Pursuant to 40 CFR 63.2338(c), affected sources (e.g., storage tanks, transfer racks, equipment leak components) that are part of an affected source under another NESHAP are not subject to Subpart EEEE. In addition, the definition of organic liquids excludes gasoline, distillate oils No. 1 and No. 2, and wastewater, and any non-crude liquid that contains less than 5 percent by weight organic HAP (e.g., butane). For these reasons, Subpart EEEE does not apply to the Kenova-TriState Terminal.

### 2.4.6. Part 63 NESHAP Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

NESHAP Subpart ZZZZ applies to facilities that operate stationary reciprocating internal combustion engines (RICE). MPLXT operates one (1) 510 horsepower (HP) diesel-fired emergency RICE for a fire water pump that is subject to the provisions of 40 CFR 63 Subpart ZZZZ. However, the engine does not have to meet the requirements of Subpart ZZZZ and 40 CFR 63 Subpart A, except the initial notification requirements pursuant to 40 CFR 63.6590(b)(i) as long as the engine complies with the requirements for emergency operations, per 40 CFR 63.6640(f). This includes a limit of 100 hours per year for maintenance and testing, of which 50 (of the 100) can be for non-emergency operation.

MPLXT also owns and operates one (1) diesel fired non-emergency RICE that is subject to the provisions of 40 CFR 63, Subpart ZZZZ. This engine will meet the requirements of Subpart ZZZZ by complying with the requirements of 40 CFR 60, Subpart IIII in accordance with 40 CFR 63.6590(c)(7) (see Section 2.3.3 above). No other MACT ZZZZ requirements apply to the non-emergency engine.

Upon submittal of this renewal application, the terminal will be considered a major source of HAP. MPLXT proposes a period of three (3) years after submitting this renewal application to comply with the newly applicable provisions of 40 CFR 63, Subpart ZZZZ for the emergency engine, which is consistent with the timeline specified in 40 CFR 63.6595(b)(2).

### 2.4.7. Part 63 NESHAP Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters (at Major Sources)

NESHAP Subpart DDDDD applies to boilers and process heaters at major sources of HAP. The Kenova-TriState Terminal utilizes a hot oil heater (heat input of 2.499 MMBtu/hr) to regulate the temperature of the biodiesel stored in Tank 273 (Tank 1S).

40 CFR 63.7575 defines the criteria for inclusion in the 'unit designed to burn gas 1' subcategory according to the following:

> *…any boiler or process heater that burns only natural gas, refinery gas, and/or other gas 1 fuels. Gaseous fuel boilers and process heaters that burn liquid fuel for periodic testing of liquid fuel, maintenance, or operator training, not to exceed a combined total of 48 hours during any calendar year, are included in this definition. Gaseous fuel boilers and process heaters that burn liquid fuel during periods of gas curtailment or gas supply interruptions of any duration are also included in this definition.*

The hot oil heater qualifies as a "unit designed to burn gas 1," since it is a natural gas-fired process heater that will only fire diesel during periods of gas curtailment or gas supply interruptions.

Upon submittal of this renewal application, the terminal will be considered a major source of HAP. MPLXT proposes a period of three (3) years after submitting this renewal application to comply with the newly applicable provisions of 40 CFR 63, Subpart DDDDD for the heater, which is consistent with the timeline specified 40 CFR 63.7495(c)(2).

### 2.4.8. Part 63 NESHAP Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers and Process Heaters (at Area Sources)

NESHAP Subpart JJJJJJ applies to boilers located at area sources of HAP. 40 CFR 63.11237 defines a boiler as follows:

> *…enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water. Controlled flame combustion refers to a steady-state, or near steady-state, process wherein fuel and/or oxidizer feed rates are controlled. A device combusting solid waste, as defined in § 241.3 of this chapter, is not a boiler unless the device is exempt from the definition of a solid waste incineration unit as provided in section 129(g)(1) of the Clean Air Act. Waste heat boilers, process heaters, and autoclaves are excluded from the definition of Boiler.*

Because the hot oil heater is a process heater, it does not meet the definition of a boiler as provided under the rule. Therefore, the provisions of NESHAP JJJJJJ are not applicable to the hot oil heater at the Kenova-TriState Terminal.

### 2.4.9. Part 63 NESHAP Subpart BBBBBB

Per 40 CFR 63.11081(a), NESHAP BBBBBB applies to area source bulk gasoline terminals that are not subject to MACT R, pipeline breakout stations that are not subject to MACT R, pipeline pumping stations, and bulk gasoline plants. The Kenova-TriState Terminal is subject to MACT R and is not a pipeline pumping station or bulk gasoline plant (as defined in 40 CFR 63.11100). Therefore, NESHAP BBBBBB does not apply to the Kenova-TriState Terminal.

### 2.4.10. Part 63 NESHAP Subpart CCCCCC

40 CFR 63, Subpart CCCCCC (GACT 6C) regulates the loading of gasoline storage tanks at gasoline dispensing facilities (GDFs). Affected sources under GACT 6C include GDFs that are located at an area source of HAP. A GDF is defined as

> *any stationary facility which dispenses gasoline into the fuel tank of a motor vehicle, motor vehicle engine, nonroad vehicle, or nonroad engine.*

There are no stationary facilities at the Kenova-TriState Terminal that dispense a material meeting the definition of gasoline[4] into the fuel tank of a vehicle. Thus, the provisions of GACT 6C are not applicable to the Kenova-TriState Terminal.

## 2.5. COMPLIANCE ASSURANCE MONITORING

Under 40 CFR 64, the Compliance Assurance Monitoring (CAM) regulations, facilities are required to prepare and submit monitoring plans for certain emissions units with the initial or renewal Title V operating permit application. CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits for sources that utilize active control devices where existing Title V permit requirements may not be considered sufficient.

Under the general applicability criteria, this regulation applies only to emission units that use a control device to comply with a federally-enforceable requirement (e.g. emission limit) for which the pre-controlled emission levels exceed the major source thresholds under the Title V operating permit program. It should be noted that based on the definitions in the rule, a "control device" does not include passive control measures that act to prevent pollutants from forming, such as the use of seals, lids, or roofs to prevent the release of pollutants, use of low-polluting fuel or feedstocks, or the use of combustion or other process design features or characteristics. Accordingly, none of the storage tanks with floating roofs at the Kenova-TriState Terminal are equipped with a control device with respect to CAM applicability. The only emission unit with a control device (and therefore the only emission unit potentially subject to CAM provisions) is the barge loading rack.

Volatile organic compound (VOC) emissions from barge loading operations are controlled by a vapor recovery unit (VRU) when loading gasoline. 40 CFR 63.562(b)(2) requires that MPLXT reduce captured HAP emissions from marine tank vessel loading operations by 97 weight-percent. 40 CFR 63.564(a) establishes monitoring requirements under MACT Y, and MPLXT complies with these standards through the use of a Continuous Emissions Monitoring System (CEMS). As provided in 40 CFR 64.2(b)(1)(i), CAM requirements do not apply to MACT emission limits promulgated after November 15, 1990. Because the only applicable emission limit is established in MACT Y, which was promulgated September 19, 1995, the 97 weight-percent limit is not subject to the requirements of CAM.

Loading operations are additionally subject to the reasonably available control technology (RACT) standards established in 40 CFR 63.562(c). Specifically, MPLXT must also reduce captured VOC emissions by 95 weight-percent per 40 CFR 63.562(c)(3). However, 40 CFR 64.2(b)(1)(vi) provides that any emission limitations or standards for which a permit issued in accordance with 40 CFR 70 or 40 CFR 71 establishes a continuous compliance determination method is exempt from CAM requirements. MPLXT assesses compliance with this limit via use of the CEMS in accordance with the Title V permit. 40 CFR 64.1 defines 'continuous compliance determination method' as:

> *… a method, specified by the applicable standard or an applicable permit condition, which:*
>
> *(1) Is used to determine compliance with an emission limitation or standard on a continuous basis, consistent with the averaging period established for the emission limitation or standard; and*
>
> *(2) Provides data either in units of the standard or correlated directly with the compliance limit.*

Because the CEMS operates on a continuous basis and provides data which directly correlate with the compliance limit,[5] the CEMS meets the two (2) criteria required to constitute a continuous compliance determination method as

[4] Per 40 CFR 63.11132, "*Gasoline* means any petroleum distillate or petroleum distillate/ alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater, which is used as a fuel for internal combustion engines."

[5] Per 40 CFR 63.563(b)(6)(iii), the facility shall operate with a block average outlet VOC concentration as determined in 40 CFR 63.564(g)(1) of no more than 1,200 ppmv VOC.

defined in 40 CFR 64.1. Therefore, the RACT limit is also exempt from the requirements of CAM in accordance with 40 CFR 64.2(b)(1)(vi).

45CSR34 incorporates by reference applicable MACT requirements; no other SIP rules limit VOC emissions from the loading operations. Therefore, the loading operations are not subject to CAM requirements.

Additionally, MPLXT is requesting an operational restriction per 45CSR30-12.7 to require the capture and control of dock arrival emissions using the existing VRU. The VRU is subject and complies with MACT Y control requirements, but MACT Y does not apply to the dock arrival depressurization emissions. Thus, MPLXT is not using a control device to comply with a federally enforceable emission limit.

Because no emission unit meets all three applicability criteria (i.e., uses a control device, uses that control device to comply with a federally enforceable emission limit, and has pre-controlled emissions exceeding major source thresholds), CAM is not applicable to any emission units at the Kenova-TriState Terminal.

## 2.6. RISK MANAGEMENT PLAN REGULATIONS

Subpart B of 40 CFR 68 outlines requirements for risk management prevention plans pursuant to Section 112(r) of the Clean Air Act. Applicability of the subpart is determined based on the type and quantity of chemicals stored at a facility. Regulated substances in gasoline, when in distribution or related storage for use as fuel for internal combustion engines, are exempt from the threshold determination per 40 CFR 68.115(b)(2)(ii). Therefore, MPLXT has evaluated the amount of Section 112(r) substances stored at the Kenova-TriState Terminal after excluding gasoline and determined that the facility will be subject to Section 112(r) because it plans to store butane (not contained within gasoline) in quantities greater than 10,000 pounds at any one time as a part of the butane blending project. MPLXT requested an off permit change for this project in December of 2018. As a result, MPLXT will submit a Risk Management Plan (RMP) to U.S. EPA prior to initial start-up of the regulated butane blending operations at the facility.

## 2.7. STRATOSPHERIC OZONE PROTECTION REGULATIONS

The requirements originating from Title VI of the Clean Air Act, entitled *Protection of Stratospheric Ozone,* are contained in 40 CFR 82. Subparts A through E and Subparts G and H of 40 CFR Part 82 are not applicable to the Kenova-TriState Terminal (as the Kenova-TriState Terminal does not engage in the activities regulated therein). 40 CFR 82 Subpart F, *Recycling and Emissions Reduction,* potentially applies if the facility operates, maintains, repairs, services, or disposes of appliances that utilize Class I or Class II ozone depleting substances. Subpart F generally applies to the facility, and MPLXT will continue to operate in compliance with the applicable requirements.

## 2.8. WEST VIRGINIA SIP REGULATIONS

This section of the application highlights applicability of specific West Virginia State Implementation Plan (SIP) regulations that may apply to the Kenova-TriState Terminal.

### 2.8.1. 45CSR2: To Prevent and Control Particulate Matter Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45CSR2 contains requirements for particulate matter emissions from the combustion of fuel in indirect heat exchangers. The provisions of 45CSR2-2.14 define indirect heat exchangers as the following:

> *… a device that combusts any fuel and produces steam or heats water or any other heat transfer medium.*

The engines installed at the Kenova-TriState Terminal do not meet the definition of an indirect heat exchanger; therefore, they are not subject to the requirements of 45CSR2. However, the hot oil heater does meet the definition of an indirect heat exchanger. Pursuant to 45CSR2-3.1, emissions of smoke and/or particulate matter from the hot oil heater must not exceed ten (10) percent opacity based on a six-minute average.

Per 45CSR2-11.1, any fuel burning unit with a heat input of less than ten (10) MMBtu/hr is exempt from sections 4, 5, 6, 8, and 9 of this rule. As the hot oil heater has a heat input capacity of 2.499 MMBtu/hr, the heater is not subject to any requirements from Sections 4, 5, 6, 8, and 9 of this rule.

### 2.8.2. 45CSR4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor – State Only

According to 45CSR4-3:

> *No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.*

The Kenova-TriState Terminal is subject to this state-only requirement. MPLXT will continue to operate in compliance with this rule by minimizing or eliminating objectionable odors as needed.

### 2.8.3. 45CSR6: To Prevent and Control Air Pollution from Combustion of Refuse

According to 45CSR6-3:

> *The open burning of refuse by any person is prohibited…*

The Kenova-TriState Terminal is subject to this state-only requirement. MPLXT will continue to operate in compliance with this rule by prohibiting the open burning of refuse.

### 2.8.4. 45CSR7: To Prevent and Control Particulate Matter Air Pollution from Manufacturing Processes and Other Associated Operations

45CSR7 includes provisions intended to prevent and control emissions of particulate matter from manufacturing processes and associated operations. Because the fire water pump engine serves the sole purpose of fire suppression and does not support any manufacturing activities, this engine does not meet the definition of a manufacturing process pursuant to 45CSR7-2.38. Similarly, the backup engine serves to pump excess rainwater to prevent flooding in the tank farm during periods of substantial rainfall. Therefore, the requirements of 45CSR7 do not apply to the engines at the Kenova-TriState Terminal. Furthermore, in accordance with 45CSR7-10.1, the provisions of this rule do not apply to particulate matter emissions regulated by 45CSR2, 3, and 5. Because 45CSR2 establishes an opacity limit for MPLXT's hot oil heater, the hot oil heater is exempt from the provisions of 45CSR7.

The requirements of 45CSR7-5 apply to sources of fugitive particulate matter, including the roadways/parking areas and the cooling tower. MPLXT complies with the requirements of 45CSR7-5.2 by applying appropriate control measures (i.e., paving) to plant roadways to minimize particulate emissions. MPLXT will also comply with the requirements of 45CSR7 for the cooling tower. 45CSR7-5.1 stipulates that the cooling tower is equipped with a system (which may include process equipment design, control equipment design, or operation and maintenance procedures) to minimize emissions of fugitive particulate emissions. MPLXT utilizes a conductivity controller to automatically sample the cooling water line. If the controller receives a sample outside the operating range, it will conduct a blowdown, thus preventing total dissolved solids from accumulating in the cooling water and minimizing particulate emissions.

### 2.8.5. 45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This rule prevents and controls emissions of sulfur oxides ($SO_X$) from fuel burning sources, manufacturing process sources, and the combustion of refinery and/or process gas streams. The engines meet neither the definition of fuel burning source pursuant to 45CSR10-2.8 nor the definition of manufacturing process pursuant to 45CSR10-2.11. Because the engines will not fire process or refinery fuel gas, the requirements of 45CSR10 do not apply to the engines.

According to 45CSR10-10.1, any fuel burning unit having a design heat capacity under ten (10) MMBtu/hr is exempt from Section 3 and Sections 6-8 of 45CSR10. The hot oil heater has a heat input capacity of 2.499 MMBtu/hr. Furthermore, the heater does not meet the definition of manufacturing process pursuant to 45CSR10-2.11 and will not fire process or refinery fuel gas. Accordingly, the hot oil heater at MPLXT's Kenova-TriState Terminal is not subject to any substantive requirements under 45CSR10.

### 2.8.6. 45CSR11: Prevention of Air Pollution Emergency Episodes

According to 45CSR11-5.1:

> *Any person responsible for the operation of a source of air pollutants emitting 100 tons per year or more in a region classified Priority I or II for any pollutant, shall prepare standby plans for reducing the emission of air pollutants during periods of an Air Pollution Alert, Air Pollution Warning, and Air Pollution Emergency.*

The Kenova-TriState Terminal is subject to this rule. The facility is located in West Virginia Air Quality Control Region 3 (USEPA AQCR 103). This region is classified as Priority I for particulate matter and Priority III for sulfur oxides, carbon monoxide, nitrogen dioxide, hydrocarbons and ozone according to the Pollutant Table of 45CSR11.

Facility-wide emissions of particulate matter are below 100 tons per year. When requested by the secretary, MPLXT is responsible for providing a written emergency standby plan in accordance with this rule.

### 2.8.7. 45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation

According to 45CSR13-5:

> *No person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without notifying the Secretary of such intent and obtaining a permit to construct, modify, relocate and operate the stationary source as required in this rule or any other applicable rule promulgated by the Secretary.*

The provisions for construction permits under 45CSR13 apply to the Kenova-TriState Terminal. Currently, the Kenova-TriState Terminal has two (2) active construction permits: R13-1352A and R13-2277C. In the event that MPLXT would propose the construction of an additional unit at the Kenova-TriState Terminal, or modifications to existing units, the proper Rule 13 (R13) permit application procedures would be followed.[6]

### 2.8.8. 45CSR16: Standards of Performance for New Stationary Sources

The provisions of 45CSR16 incorporate by reference the NSPS standards contained in 40 CFR 60. MPLXT will continue to comply with NSPS Kb as described in Section 2.3.1 of this report.

### 2.8.9. 45CSR21, Section 21: Bulk Gasoline Plant

45CSR21-21 applies to all unloading, loading, and storage operations at bulk gasoline plants. A bulk gasoline plant is defined as:

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[6] MPLXT does not have any permits issued under 45CSR14 or 45CSR19.

> *...a gasoline storage and distribution facility with an average daily throughput of 76,000 liters (L) (20,000 gallons [gal]) of gasoline or less on a 30-day rolling average.*

The Kenova-TriState Terminal has a daily gasoline throughput that exceeds 20,000 gallons as a 30-day rolling average. Therefore, 45CSR21-21 does not apply.

### 2.8.10. 45CSR21 Section 22: Bulk Gasoline Terminals

According to 45CSR21-22:

> *22.1. Applicability. -- This section 22 applies to all loading racks at any bulk gasoline terminal which deliver liquid product into gasoline tank trucks.*

This rule is not applicable to the Kenova-TriState Terminal, as the terminal does not operate loading racks that deliver liquid product into gasoline tank trucks.

### 2.8.11. 45CSR21 Section 23: Gasoline Dispensing Facility

According to 45CSR21-23:

> *23.1. Applicability. -- This section 23 applies to any gasoline dispensing facility and the appurtenant equipment necessary to a gasoline dispensing facility.*

This rule is not applicable to the Kenova-TriState Terminal, as the terminal does not load gasoline into a motor vehicle gasoline tank used to provide fuel to the engine of that motor vehicle.

### 2.8.12. 45CSR21 Section 24: Leaks from Gasoline Tank Trucks

According to 45CSR21-24:

> *24.1. Applicability. -- This section 24 applies to any gasoline tank truck equipped for gasoline vapor collection.*

This rule is not applicable to the Kenova-TriState Terminal, as the terminal does not operate loading racks that deliver liquid product into gasoline tank trucks.

### 2.8.13. 45CSR21 Sections 27 and 28: Petroleum Liquid Storage in External Floating Roof Tanks and Petroleum Liquid Storage in Fixed Roof Tanks

45CSR21-27 applies to petroleum liquid storage in tanks with external floating roofs with capacities greater than 40,000 gallons. 45CSR21-28 applies to petroleum liquid storage in tanks with fixed roofs (including those equipped with internal floating roofs) with capacities greater than 40,000 gallons. These sections of this rule will apply to several storage tanks at the Kenova-TriState Terminal. Tanks greater than 40,000 gallons storing a petroleum liquid with a maximum true vapor pressure less than 10.5 kiloPascals (kPa) (1.5 pounds per square inch atmospheric ([psia]), such as distillate oil or kerosene, are exempt from 45CSR21-27 and 28 as long as records are maintain of the material stored. The applicability of this rule to each storage tank is indicated on the Emission Unit form for each tank, included in Attachment E of this document.

### 2.8.14. 45CSR21 Section 40: Other Facilities that Emit Volatile Organic Compounds (VOC)

45CSR21-40 applies to any facility that has aggregate maximum theoretical VOC emissions in excess of 100 tpy in the absence of control devices. However, sources regulated under Sections 11 through 39 of 45CSR21, as well as barge loading and the hot oil heater (per 45CSR21-40.1.d), can be excluded when comparing facility VOC emissions to the 100 tpy applicability threshold. VOC emissions from the remaining sources (e.g., tanks subject but exempt from 45CSR21-27 or 28, oily water sewer system, fugitive leaks, etc.) do not exceed 100 tpy. Therefore, the Kenova-TriState Terminal is not subject to 45CSR21-40.

### 2.8.15. 45CSR22: Air Quality Management Fee Program

This rule is generally applicable to the Kenova-TriState Terminal; as applicable, MPLXT will pay the appropriate fees (including those associated with permits to construct) in accordance with the rule.

### 2.8.16. 45CSR29: Rule Requiring the Submission of Emission Statements for VOC Emissions and Oxides of Nitrogen Emissions

45CSR29 requires the submission of emission statements for stationary sources of $NO_X$ or VOC located in Putnam, Kanawha, Cabell, Wayne, Wood, and Greenbrier Counties. Operations at the Kenova-TriState Terminal exceed the emissions thresholds provided in 45CSR29-3.2. MPLXT submits the Certified Emission Statement as well as an emission inventory on an annual basis. Therefore, MPLXT submits an annual emissions statement in accordance with the provisions of 45CSR29-4 and 5.

### 2.8.17. 45CSR30: Requirements for Operating Permits

According to 45CSR30-3:

> *On and after the effective date of the operating program, no person shall violate any requirement of a permit issued under this rule nor shall any person operate any of the following sources, except in compliance with a permit issued under this rule.*

The Kenova-TriState Terminal is subject to the requirement for a Title V operating permit as discussed in Section 2.2 of this report. The Kenova-TriState Terminal currently operates in compliance with a Title V operating permit in accordance with this rule. Additionally, MPLXT submits (and will continue to submit) a certified emissions statement and pay the corresponding fees in accordance with 45CSR30-8.

### 2.8.18. 45CSR34: Emission Standards for Hazardous Air Pollutants

The provisions of 45CSR34 incorporate by reference the MACT standards contained in 40 CFR 63. MPLXT will comply with MACT R, MACT Y, MACT ZZZZ, and MACT DDDDD as described in the subsections of Section 2.4 of this application.

### 2.8.19. Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rule applicability to the Kenova-TriState Terminal reveals many SIP regulations that do not apply or impose additional requirements on operations. Such SIP rules include those specific to a particular type of industrial operation that is categorically not applicable to the facility.

# 3. CALCULATION METHODOLOGY

This section of the application provides a discussion of emission calculation methodology used for the emission sources at the Kenova-TriState Terminal. Detailed potential emissions calculations are provided in Appendix I to this report.

## 3.1. EMISSIONS FROM STORAGE TANKS

The Kenova-TriState Terminal includes multiple storage tanks that store a variety of petroleum products. Since the last permit renewal, MPLXT implemented the TankESP® software to calculate potential routine (working/standing loss) emissions from storage tanks instead of EPA's TANKS 4.09d after conferring with WVDEP as to whether they would accept this approach. The WVDEP had no objections to the use of TankESP® software in preparing emission estimates for this renewal application.[7] TankESP® is a software program that uses the emission factors and formulas from AP-42 Section 7.1 (Organic Liquid Storage Tanks, 11/2006) and calculates emissions based on tank size, type, throughput, and contents. Routine emissions are calculated as working losses, which occur due to vapor replacement during the filling and emptying of the tank, and breathing losses, which are caused by vapor expansion and contraction due to temperature variations. Due to the nature of the tank contents, it was assumed that all emissions are VOC emissions.

Information was gathered for each tank concerning its working volume, type, fittings and seals (for floating roof tanks), throughput, and contents. If a tank is able to store more than one type of material throughout the year, emissions for each material were compared and the worst-case emissions were selected. In the case of tanks that can store gasoline or distillate fuels, gasoline was used to calculate emissions. MPLXT also considered seasonal variability in the gasoline stored in the tanks; specifically, MPLXT applied the following product storage schedule to obtain emissions estimates from the tanks:

- Gasoline RVP 15: January-March, October-December;
- Gasoline RVP 13.5: April, September;
- Gasoline RVP 9: May-August.

The VOC emissions from the tanks were calculated using historical throughputs for the tanks multiplied by a safety factor to give a maximum possible throughput. For tanks that store only distillate fuels, kerosene was used to estimate emissions. For the petroleum contact water tank, a worst-case scenario of a gasoline layer was assumed.

Details of the sizes, types, contents and throughputs of each tank are provided in Attachment E of this application, as well as in the detailed emissions calculations in Attachment I.

## 3.2. EMISSIONS FROM TANK CLEANING AND LANDING LOSSES

In addition to standard working and breathing emissions from storage tanks, emissions in floating roof tanks due to cleaning and landing losses were estimated. Landing emissions occur when a floating roof tank has been emptied to the point that the roof is resting on the roof leg supports and is no longer floating on the liquid. Cleaning emissions occur as the tank is further emptied after landing and degassed. In developing these estimates, MPLXT determined the combination of material stored and seasonal meteorological data resulting in the highest potential emissions (e.g., Gasoline RVP 13.5 in September for floating roof tanks storing gasoline) and assumed the tank was landed and cleaned during that month. Landing loss emissions were estimated using the methodology in AP-42 Section 7.1.3.1 (11/06). Cleaning emissions are estimated by assuming the volume of the empty tank is saturated with gasoline vapors, and that the entire volume is released as VOC emissions. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the

[7] Based on phone call between Trinity Consultants and Rex Compston on 7/23/2018.

potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

## 3.3. FUGITIVE EMISSIONS FROM EQUIPMENT LEAKS

Fugitive emissions occur through leakage from a variety of fittings that are present on the equipment at the Kenova-TriState Terminal that store and transmit petroleum liquids. These fittings include valves, connectors, flanges, pump seals, and pressure release valves.

Fugitive emissions from equipment leaks are calculated based on the number of components at the Kenova-TriState Terminal and EPA’s averaging emission factor method that is described in EPA's Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017) dated November 1995. Emission factors for marketing terminals (Table 2-3) were used to quantify these emissions. Since the EPA document does not provide emission factors for components in heavy liquid service (i.e., jet kerosene), MPLXT conservatively applied the light liquid factors to these components as well.

Fugitive emissions also result from disconnecting the truck hose after butane offloading is completed. Upon disconnect, a small quantity of VOC is emitted from each connector as a result of the residual butane in the hose. The amount of loss per disconnect event can be estimated using the number of hose connectors disconnected per event, and the amount of loss from each connector. The annual emissions estimate are based off the estimated number of transport trucks required to offload the maximum amount of butane the site could process in a year and the average butane load per truck. The short term emissions estimate assume a maximum of one disconnect event per hour from truck offloading.

## 3.4. EMISSIONS FROM DOCKSIDE BARGE ARRIVAL AND DEPARTURE GAUGING/ SAMPLING

Emissions occur from tankerman dockside activities conducted prior to marine vessel loading and after loading is complete. These can include, but are not limited to: connection and disconnection of the shore vapor control hose, product loading lines, and opening of cargo hatches for inventory gauging and collection of quality control (PQ) samples. Dockside arrival emissions can result when positive pressure in the cargo tank(s) is released from tankerman activities. However, not all cargo tanks have dockside positive pressure upon arrival. Ambient conditions and cargo tank contents will influence the occurrence of positive pressure and in some cases the cargo tanks will be under negative pressure (i.e., vacuum). Similarly dockside departure emissions occur after loading is complete and positive pressure is released from the cargo tank when tankerman perform PQ sampling or gauging of the material loaded.

The barge dockside emission factors were determined with the vessel depressurization equations (Eq. 3-18 - 3-20) from the August 2007 EPA document, "Methods for Estimating Air Emissions from Chemical Manufacturing Facilities," Volume II: Chapter 16. MPLXT plans to capture and control the dockside arrival depressurization emissions using the existing VRU, which achieves greater than or equal to 97% control efficiency (see Section 3.5 below).

Additionally, an emission factor is included for evaporation during sampling based on an estimated product displacement that occurs during sampling.

The gasoline and distillate factors derived for the potential emission calculations from these activities are based on worst-case assumptions for barge pressure, ambient temperature, material loaded/material vapor pressure, vapor space saturation factor, and sampling time that are derived from a review of actual measured data. Dockside emissions from each barge can be unique and are dependent on multiple variables, as outlined above.

## 3.5. EMISSIONS FROM MARINE BARGE LOADING

Hourly emissions from marine barge loading are quantified based on the hydraulic limitations imposed by the piping and pumps associated with the VRU; specifically, only 13,600 bbls/hr of gasoline can be loaded at any given time as a result of these limitations. Distillate loading is limited to one loading arm (i.e., 6,000 bbl/hr) when gasoline is being loaded at capacity (representing the worst-case scenario from an hourly emissions perspective). Potential emission calculations utilize emission factors provided in AP-42, Section 5.2 (6/08), and account for 100% capture efficiency[8] and 97% control efficiency[9] at the VRU when loading gasoline. MPLXT does not recover vapors from distillate barge loading, and MPLXT therefore does not apply any capture or control efficiencies to distillate loading operations.

Annual emissions are based on the controlled gasoline loading emission factor, and the maximum daily loading capacity (8 barges/day), a barge capacity of 25,000 bbl, and 365 days per year of operation.

## 3.6. EMISSIONS FROM TANK 273 HOT OIL HEATER

The hot oil heater provides heat to regulate the temperature of the contents of Tank 273 in order to maintain the stored biodiesel at the appropriate temperature necessary to maintain product quality. Combustion emissions from the natural gas-fired heater are quantified using the factor for natural gas-fired external combustion sources from AP-42 Section 1.4 (7/98) and the maximum heat input capacity.

## 3.7. EMISSIONS FROM ENGINES

Emissions from the emergency fire water pump diesel-fired engine are calculated using the manufacturer's engine specifications (e.g., horsepower) and the manufacturer's emissions certification data with not-to-exceed (NTE) multipliers per 40 CFR 60.4212(c). MPLXT assumes a 500 hour-per-year operating limit since the engine is used only during emergencies and scheduled testing. Emissions of $SO_2$ are estimated based on a 15 ppm limit on sulfur content of diesel fuel pursuant to 40 CFR 60.4207(b) and 40 CFR 80.510(b).

Emissions from the diesel-fired tank farm wastewater backup pump engine were determined utilizing the manufacturer's engine specifications (e.g., horsepower) and the Tier 4 standards with the NTE multipliers per 40 CFR 1039.101(e).[10] Emissions of $SO_2$ are estimated based on a 15 ppm limit on sulfur content of diesel fuel pursuant to 40 CFR 60.4207(b) and 40 CFR 80.510(b).

## 3.8. EMISSIONS FROM DIESEL FUELING OPERATIONS

MPLXT is capable of fueling boats. Potential emissions from this process were estimated using assumptions regarding the maximum amount of distillate throughput that would ever be realized at these operations and the emission factor for splash loading operations from Table 5.2.5 in AP-42 Section 5.2 (6/08).

## 3.9. EMISSIONS FROM ROADWAY TRAFFIC

Traffic via the paved roadways and parking lots at MPLXT's Kenova-TriState Terminal will generate fugitive particulate emissions. MPLXT quantified these emissions by making assumptions regarding the maximum amount of vehicular traffic via specific vehicle pathways. MPLXT used the calculations and methodologies established in AP-42, Section 13.2.1 (1/2011).

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[8] 100% capture efficiency is assumed in accordance the preamble to MACT Y (May 13, 1994), which indicates that 100% capture efficiency can be applied when vapor tight vessels are loaded. Furthermore, an assist blower maintains a vacuum of at least 1.5 inches water column during loading.

[9] 97% control efficiency required per 40 CFR 63.562(b)(2).

[10] Tier 4 emission factors are found in 40 CFR 1039.101(b) Table 1

## 3.10. COOLING TOWER EMISSIONS

MPLXT operates a cooling tower to regulate the temperature of the gasoline supply loop used to operate the adsorber of the vapor recovery unit. Operation of the cooling tower generates a small amount of particulate emissions. These emissions were quantified using the design recirculation rate of 400 gallons/minute and engineering assumptions regarding the drift loss and relevant characteristics of the water (i.e., conductivity). Emissions were estimated using the methodology provided in AP-42, Section 13.4.2 (1/1995).

## 3.11. OILY SEWER SYSTEM EMISSIONS

A network of drains, sumps, pipes, and lift stations serve to convey process wastewater (petroleum contact water) to Tank 256. MPLXT estimated emissions resulting from this sewer system by determining the amount of various components in the system, estimating a maximum possible system throughput, and applying an appropriate emission factor for each component within EPA's Refinery Wastewater Emissions Tool (RWET) (11/10). Pollutant-specific emissions were estimated using available sample data for benzene in the wastewater exiting Tank 256 and applying the ratios provided in Table 7-9 of "Emission Estimation Protocol for Petroleum Refineries: Version 2.1.1" for HAPs present in gasoline or distillate.

## 3.12. EMISSIONS FROM GASOLINE FILTER CHANGEOUTS

MPLXT has quantified the expected fugitive emissions that occur during the change-out of gasoline filters. These emissions were estimated using the volume of gasoline involved during the filter change-out, a conservative engineering estimate of the amount gasoline vapor emitted during the change-out, and the number of expected change-outs each year. Emissions were calculated using the equation below:

$$E = \frac{V_G x\ N\ x\ P_G x\ \rho_G}{2000}$$

Where:

E = VOC emissions (tons VOC per year)
$V_G$ = estimated volume of gasoline per filter change-out (gallons)
N = estimate number of change-outs per year
$P_G$ = estimated percentage of gasoline vapor emitted per change-out (%)
$\rho_G$ = density of gasoline (lb/gallon)
2000 = conversion from lbs to tons

## 3.13. FACILITY-WIDE HAP EMISSIONS

MPLXT has also included potential HAP emissions calculated using the maximum VOC emissions presented in Attachment I and the HAP content constants for gasoline and distillate given in Table 3.1 of the Gasoline Distribution Industry (Stage I) – Background Information for Proposed Standards Draft Report. When appropriate, MPLXT applied factors from AP-42 and other sources as discussed in Sections 3.1-3.12 and as documented in Attachment I.

## 3.14. FACILITY-WIDE EMISSIONS

Additional detailed documentation for each of these sources, including relevant assumptions and calculation methodology, is included in Attachment I. Attachment I also provides a summary of the unit-specific emissions and facility-wide emissions on a pollutant-by-pollutant basis.

# 4. TITLE V APPLICATION FORMS

The WVDEP permit application forms contained in this application include facility-wide and emission source specific forms for the Kenova-TriState Terminal facility Title V permit. The completed Title V permit forms are included in this section.

**WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**DIVISION OF AIR QUALITY**

601 57th Street SE

Charleston, WV 25304

Phone: (304) 926-0475

www.dep.wv.gov/daq

# INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

***Section 1: General Information***

| | |
|---|---|
| 1. **Name of Applicant (As registered with the WV Secretary of State's Office):**<br>MPLX Terminals LLC | **2. Facility Name or Location:**<br>Kenova-TriState Terminal<br>Kenova, Wayne County, West Virginia |
| **3. DAQ Plant ID No.:**<br>0 9 9 — 0 0 0 2 2 | **4. Federal Employer ID No. (FEIN):**<br>3 1 1 5 3 7 6 5 5 |

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence? 01/01/1951

☒ Permit Renewal — What is the expiration date of the existing permit? 03/24/2020

☐ Update to Initial/Renewal Permit Application

| | |
|---|---|
| **6. Type of Business Entity:**<br>☐ Corporation ☐ Governmental Agency ☒ LLC<br>☐ Partnership ☐ Limited Partnership | **7. Is the Applicant the:**<br>☐ Owner ☐ Operator ☒ Both<br>If the Applicant is not both the owner and operator, please provide the name and address of the other party.<br>_____<br>_____<br>_____ |
| **8. Number of onsite employees:**<br>72 | |

**9. Governmental Code:**

☒ Privately owned and operated; 0 ☐ County government owned and operated; 3

☐ Federally owned and operated; 1 ☐ Municipality government owned and operated; 4

☐ State government owned and operated; 2 ☐ District government owned and operated; 5

**10. Business Confidentiality Claims**

Does this application include confidential information (per 45CSR31)? ☐ Yes ☒ No

If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY"* guidance.

| 11. Mailing Address | | |
| --- | --- | --- |
| **Street or P.O. Box:** 539 South Main Street | | |
| **City:** Findlay | **State:** OH | **Zip:** **45840-3295** |
| **Telephone Number:** (419) 421-3774 | **Fax Number:** (419) 421-2905 | |

| 12. Facility Location | | |
| --- | --- | --- |
| **Street:** 23rd and River Streets | **City:** Kenova | **County:** Wayne County |
| **UTM Easting:** 361.323 km | **UTM Northing:** 4,251.68 km | **Zone:** ☒ 17 or ☐ 18 |
| **Directions:** From Charleston, travel I-64 to the Ceredo/Kenova exit. Take Highway 75 North to Route 60 West. Turn right onto 21st Street, then left on Beech Street. Storage Tank farm on left, second black top road to the right and through flood wall is the office and barge loading. | | |
| **Portable Source?** ☐ Yes ☒ No | | |
| **Is facility located within a nonattainment area?** ☐ Yes ☒ No | | **If yes, for what air pollutants?** |
| **Is facility located within 50 miles of another state?** ☒ Yes ☐ No | | **If yes, name the affected state(s).** KY, OH |
| **Is facility located within 100 km of a Class I Area[1]?** ☐ Yes ☒ No<br>**If no, do emissions impact a Class I Area[1]?** ☐ Yes ☒ No | | **If yes, name the area(s).** |
| [1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.* | | |

| 13. Contact Information | | |
|---|---|---|
| **Responsible Official:** Angela Brown | | **Title:** Vice President |
| **Street or P.O. Box:** 539 South Main Street | | |
| **City:** Findlay | **State:** OH | **Zip: 45840-** |
| **Telephone Number:** (419) 421-2629 | **Fax Number:** (419) 421-2905 | |
| **E-mail address:** asbrown@marathonpetroleum.com | | |
| **Environmental Contact:** Greg Moore | | **Title:** Health, Safety, and Environmental Manager |
| **Street or P.O. Box:** 539 South Main Street | | |
| **City:** Findlay | **State:** OH | **Zip: 45840-3295** |
| **Telephone Number:** (419) 421-3774 | **Fax Number:** (419) 421-2905 | |
| **E-mail address:** wgmoore@marathonpetroleum.com | | |
| **Application Preparer:** Greg Moore | | **Title:** Health, Safety, and Environmental Manager |
| **Company:** MPLX Terminals LLC | | |
| **Street or P.O. Box:** 539 South Main Street | | |
| **City:** Findlay | **State:** OH | **Zip: 45840-3295** |
| **Telephone Number:** (419) 421-3774 | **Fax Number:** (419) 421-2905 | |
| **E-mail address:** wgmoore@marathonpetroleum.com | | |

| 14. Facility Description | | | |
|---|---|---|---|
| List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation. | | | |
| Process | Products | NAICS | SIC |
| Petroleum Bulk Stations and Terminals | Gasoline, Distillate, K-1 / Jet Fuel | 424710 | 5171 |
| Barge Loading | Petroleum Products | 488320 | 4491 |
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**Provide a general description of operations.**

The petroleum liquid operation at this terminal involve transportation by pipeline, storage in bulk tanks, and loading or marine barges. The operations have potential sources of evaporation loss through fugitive emissions in transportation, standing/working losses in storage, and emissions from the loading of marine barges.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

*Section 2: Applicable Requirements*

| 18. Applicable Requirements Summary | |
|---|---|
| Instructions: Mark all applicable requirements. | |
| ☒ SIP | ☐ FIP |
| ☒ Minor source NSR (45CSR13) | ☐ PSD (45CSR14) |
| ☒ NESHAP (45CSR34) | ☐ Nonattainment NSR (45CSR19) |
| ☒ Section 111 NSPS | ☒ Section 112(d) MACT standards |
| ☐ Section 112(g) Case-by-case MACT | ☒ 112(r) RMP |
| ☐ Section 112(i) Early reduction of HAP | ☐ Consumer/commercial prod. reqts., section 183(e) |
| ☐ Section 129 Standards/Reqts. | ☒ Stratospheric ozone (Title VI) |
| ☒ Tank vessel reqt., section 183(f) | ☐ Emissions cap 45CSR§30-2.6.1 |
| ☐ NAAQS, increments or visibility (temp. sources) | ☐ 45CSR27 State enforceable only rule |
| ☒ 45CSR4 State enforceable only rule | ☐ Acid Rain (Title IV, 45CSR33) |
| ☐ Emissions Trading and Banking (45CSR28) | ☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64) |
| ☐ CAIR $NO_x$ Annual Trading Program (45CSR39) | ☐ CAIR $NO_x$ Ozone Season Trading Program (45CSR40) |
| ☐ CAIR $SO_2$ Trading Program (45CSR41) | |

## 19. Non Applicability Determinations

**List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.**

45CSR21, Section 21 – Not applicable because Kenova-Tristate Terminal has a daily gasoline throughput that exceeds 20,000 gallons as a 30-day rolling average.
45CSR21, Section 22 – Not applicable because Kenova-TriState Terminal does not have gasoline truck loading facilities.
45CSR21, Section 23 – Not applicable because Kenova-Tristate Terminal does not load gasoline into motor vehicle gasoline tanks to provide fuel to the engine of that motor vehicle.
45CSR21, Section 24 – Not applicable because Kenova-Tristate Terminal does not operate loading racks that deliver liquid product into gasoline tank trucks.
40 CFR 60, Subpart Dc – Not subject because Hot Oil Heater #1 has a heat input capacity of less than 10MMBtu/hr.
40 CFR 60, Subpart XX – Not subject because this facility does not have gasoline tank truck loading facilities.

40 CFR 61, Subpart BB – Not subject because the loading of gasoline and petroleum distillates are specifically exempted per 40 CFR 61.300(a).
40 CFR 63, Subpart Y – Not applicable to Dock arrival/departure gauging and sampling emissions, since these emissions do not occur during gasoline loading.
40 CFR 63, Subpart EEEE – No affected sources subject to the OLD MACT because the definition of organic liquids excludes gasoline, distillate oils No. 1 and No. 2, and wastewater, and any non-crude liquid that contains less than 5 percent by weight organic HAP.
112(r) RMP – Regulated substances in gasoline, when in distribution or related storage for use as fuel for internal combustion engines are exempt from the threshold determination per 40 CFR 68.115(b)(2)(ii).

40 CFR 60, Subpart Kb – Not applicable to Tanks 202, 255, 261, 262, and 273 per 40 CFR 60.110b(b) due to vapor pressure of stored materials.

45SCR21-27 & 28 - Not applicable to Tanks 202, 255, 261, 262, and 273 per 45CSR21-27.1.b.3-4 and 45CSR21-28.1.b.3.

40 CFR 63, Subpart R - Not applicable to Tanks 202, 255, 261, 262, and 273, since these tanks do not store gasoline.

40 CFR 63, Subpart BBBBBB - The Kenova-TriState Terminal is subject to MACT R and is not a pipeline pumping station or bulk gasoline plant. NESHAP BBBBBB does not apply to the Kenova-TriState Terminal.

40 CFR 63, Subpart JJJJJJ – Not applicable to hot oil heater for Tank 273, since process heater is exempt from the definition of boiler in 40 CFR 63.11237 and the terminal is a major source of HAP emissions.

40 CFR 63, Subpart CCCCCC – Not applicable because Kenova-Tristate Terminal does not load gasoline into motor vehicle gasoline tanks to provide fuel to the engine of that motor vehicle, and the terminal is a major source of HAP emissions.

☒ Permit Shield

**20. Facility-Wide Applicable Requirements**

**List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).**

**Open burning.** The open burning of refuse by any person is prohibited except as noted in 45CSR§6-3.1. **[45CSR§6-3.1.]**

**Open burning exemptions.** The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause or allow any form of open burning during existing or predicted periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible. **[45CSR§6-3.2.]**

**Asbestos.** The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 C.F.R. § 61.148, and 40 C.F.R. § 61.150. The permittee, owner, or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40 C.F.R. § 61.145(b)(3)(i). The USEPA, the Division of Waste Management and the Bureau for Public Health - Environmental Health require a copy of this notice to be sent to them. **[40 C.F.R. §61.145(b) and 45CSR34]**

**Odor.** No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public. **[45CSR§4-3.1 State-Enforceable only.]**

**Standby plan for reducing emissions.** When requested by the Secretary, the permittee shall prepare standby plans for reducing the emissions of air pollutants in accordance with the objectives set forth in Tables I, II, and III of 45CSR11. **[45CSR§11-5.2]**

**Ozone-depleting substances.** For those facilities performing maintenance, service, repair or disposal of appliances, the permittee shall comply with the standards for recycling and emissions reduction pursuant to 40 C.F.R. Part 82, Subpart F, except as provided for Motor Vehicle Air Conditioners (MVACs) in Subpart B:

a. Persons opening appliances for maintenance, service, repair, or disposal must comply with the prohibitions and required practices pursuant to 40 C.F.R. §§ 82.154 and 82.156.
b. Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to 40 C.F.R. § 82.158.
c. Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to 40 C.F.R. § 82.161.

**[40 C.F.R. 82, Subpart F]**

**Risk Management Plan.** Should this stationary source, as defined in 40 C.F.R. § 68.3, become subject to Part 68, then the owner or operator shall submit a risk management plan (RMP) by the date specified in 40 C.F.R. §68.10 and shall certify compliance with the requirements of Part 68 as part of the annual compliance certification as required by 40 C.F.R. Part 70 or 71. **[40 C.F.R. 68]**

**Emission inventory.** The permittee is responsible for submitting, on an annual basis, an emission inventory in accordance with the submittal requirements of the Division of Air Quality. **[W.Va. Code § 22-5-4(a)(14)]**

**MACT Subpart R.** Owners and operators shall not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to, the following:

a. Minimize gasoline spills;
b. Clean up spills as expeditiously as practicable;
c. Cover all open gasoline containers with a gasketed seal when not in use; and
d. Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators.

**[40 CFR § 63.424(g) and 45CSR34]**

**MACT Subpart R.** In addition to the reporting requirements specified in 40 C.F.R. 63, Subpart R, Table 1 "General Provisions Applicability to Subpart R," each owner or operator shall report to the Administrator a description of the types, identification numbers, and locations of all equipment in gasoline service within the time frames specified in 40 C.F.R. 63.428(f). For facilities electing to implement an instrument program under 40 C.F.R. 63.424(f), the report shall contain a full description of the program.
**[40 C.F.R. § 63.428(f); 45CSR34]**

☒ Permit Shield

**For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

## Monitoring:

**MACT Subpart R.** The permittee shall perform a monthly leak inspection of all equipment in gasoline service. For this inspection, detection methods incorporating sight, sound, and smell are acceptable. Each piece of equipment shall be inspected during the loading of a gasoline cargo tank. **[40 CFR § 63.424(a) and 45CSR34]**

## Testing:

**Stack testing.** As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia Code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling connections and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railings and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

a. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 C.F.R. Parts 60, 61, and 63, if applicable, in accordance with the Secretary's delegated authority and any established equivalency determination methods which are applicable.
b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section a of this requirement.
c. All periodic tests to determine mass emission limits from or air pollutant concentrations in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary may have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.

**[WV Code § 22-5-4(a)(15), 45CSR13, and R13-2277C]**

## Recordkeeping:

**Monitoring information.** The permittee shall keep records of monitoring information that include the following:

a. The date, place as defined in this permit and time of sampling or measurements;
b. The date(s) analyses were performed;
c. The company or entity that performed the analyses;
d. The analytical techniques or methods used;
e. The results of the analyses; and
f. The operating conditions existing at the time of sampling or measurement.

**[45CSR§30-5.1.c.2.A.; 45CSR13 – Permit No. R13-1352, Condition 4.4.1.]**

**Retention of Records.** The permittee shall retain records of all required monitoring data and support information for a period of at least five (5) years from the date of monitoring sample, measurement, report, application, or record creation date. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Where appropriate, records may be maintained in computerized form in lieu of the above records.
**[45CSR§30-5.1.c.2.B.]**

**Odors.** For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a complaint, and any responsive action(s) taken.
**[45CSR§4. State-Enforceable only.]**

**MACT Subpart R.** A log book shall be used and shall be signed by the owner or operator at the completion of each inspection. A section of the log shall contain a list, summary description, or diagram(s) showing the location of all equipment in gasoline service at the facility. **[40 CFR § 63.424(b) and 45CSR34]**

**MACT Subpart R.** The permittee shall record the following information in the log book for each leak that is detected:

a. The equipment type and identification number.
b. The nature of the leak (i.e., vapor or liquid) and the method of detection (i.e., sight, sound, or smell).
c. The date the leak was detected and the date of each attempt to repair the leak.
d. Repair methods applied in each attempt to repair the leak.
e. "Repair delayed" and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak.
f. The expected date of successful repair of the leak if the leak is not repaired within 15 days.
g. The date of successful repair of the leak.

**[40 CFR § 63.428(e) and 45CSR34]**

Each detection of a liquid or vapor leak shall be recorded in the log book. When a leak is detected, an initial attempt at repair shall be made as soon as practicable, but no later than 5 calendar days after the leak is detected. Repair or replacement of the leaking equipment shall be completed within 15 calendar days after detection of each leak, unless a demonstration is made to the Director and USEPA that repair within 15 days is not feasible. In this case, the owner or operator shall provide the reason(s) a delay is needed and the date by which each repair is expected to be completed. **[40 CFR §§ 63.424(c) and (d) and 45CSR34]**

## Reporting:

**Responsible Official.** Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
[**45CSR§30-4.4 and 5.1.c.3.D.]**

**Confidential Information.** A permittee may request confidential treatment for the submission of reporting required under 45CSR§30-5.1.c.3. pursuant to the limitations and procedures of W.Va. Code § 22-5-10 and 45CSR31. **[45CSR§30-5.1.c.3.E.]**

**Communications**. Except for the electronic submittal of the annual certification to the USEPA, all notices, requests, demands, submissions and other communications required or permitted to be made to the Secretary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by hand, mailed first class or by private carrier with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate:

| **If to the DAQ:** | **If to the US EPA:** |
|---|---|
| Director | Associate Director |
| WVDEP | Office of Enforcement and Permits Review |
| Division of Air Quality | (3AP12) |
| 601 57th Street SE | U. S. Environmental Protection Agency |
| Charleston, WV 25304 | Region III |
| Phone: 304/926-0475 | 1650 Arch Street |
| FAX: 304/926-0478 | Philadelphia, PA 19103-2029 |

**Certified emissions statement.** The permittee shall submit a certified emissions statement and pay fees on an annual basis in accordance with the submittal requirements of the Division of Air Quality. **[45CSR§30-8.]**

**Compliance certification.** The permittee shall certify compliance with the conditions of this permit on the forms provided by the DAQ. In addition to the annual compliance certification, the permittee may be required to submit certifications more frequently under an applicable requirement of this permit. The annual certification shall be submitted to the DAQ and USEPA on or before March 15 of each year, and shall certify compliance for the period ending December 31. The annual certification to the USEPA shall be submitted in electronic format only. It shall be submitted by e-mail to the following address: R3_APD_Permits@epa.gov. The permittee shall maintain a copy of the certification on site for five (5) years from submittal of the certification. **[45CSR§30-5.3.e.]**

**New applicable requirements.** If any applicable requirement is promulgated during the term of this permit, the permittee will meet such requirements on a timely basis, or in accordance with a more detailed schedule if required by the applicable requirement.
**[45CSR§30-4.3.h.1.B.]**

**MACT Subpart R.** The permittee shall report to the Director and USEPA a description of the types, identification numbers and locations of all equipment in gasoline service. **[40 CFR § 63.428(f) and 45CSR34]**

**MACT Subpart R.** The permittee shall submit in a semi-annual report to the Director and USEPA, the number of equipment leaks not repaired within 5 days of detection.**[40 CFR § 63.428(g)(3) and 45CSR34]**

**MACT Subpart R.** For each occurrence of an equipment leak for which no repair attempt was made within 5 days or for which repair was not completed within 15 days after detection, each owner or operator shall include the following information in the excess emissions report required by 40 CFR § 63.10(e)(3).
a. The date on which the leak was detected.
b. The date of each attempt to repair the leak.
c. The reasons for the delay of repair.
d. The date of successful repair.

**[40 CFR § 63.428(h)(4) and 45CSR34]**

**Are you in compliance with all facility-wide applicable requirements?** ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

| **21. Active Permits/Consent Orders** | | |
|---|---|---|
| Permit or Consent Order Number | Date of Issuance MM/DD/YYYY | List any Permit Determinations that Affect the Permit *(if any)* |
| R13-2277C | 06/07/2011 | |
| R13-1352A | 04/26/2007 | |
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| 22. **Inactive Permits/Obsolete Permit Conditions** | | |
|---|---|---|
| Permit Number | Date of Issuance | Permit Condition Number |
| Consent Order-CO-BGT-R21-94-11 | 07/15/1994 | |
| Consent Order-CO-BGT-R21-94-12 | 07/15/1994 | |
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*Section 3: Facility-Wide Emissions*

| **23. Facility-Wide Emissions Summary [Tons per Year]** | |
|---|---|
| Criteria Pollutants | Potential Emissions |
| Carbon Monoxide (CO) | 4.0 |
| Nitrogen Oxides ($NO_X$) | 4.2 |
| Lead (Pb) | N/A |
| Particulate Matter ($PM_{2.5}$)[1] | 0.1 |
| Particulate Matter ($PM_{10}$)[1] | 0.1 |
| Total Particulate Matter (TSP) | 0.2 |
| Sulfur Dioxide ($SO_2$) | 0.01 |
| Volatile Organic Compounds (VOC) | 758.7 |
| Hazardous Air Pollutants[2] | Potential Emissions |
| Benzene | 6.5 |
| Ethylbenzene | 0.9 |
| Hexane | 12.1 |
| Toluene | 9.8 |
| Trimethylpentane (2,2,4) | 6.3 |
| Xylene | 4.3 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions |
| | |
| | |
| | |
| | |

*[1]$PM_{2.5}$ and $PM_{10}$ are components of TSP.*
*[2]For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.*

*Section 4: Insignificant Activities*

| 24. Insignificant Activities (Check all that apply) | | |
|---|---|---|
| ☒ | 1. | Air compressors and pneumatically operated equipment, including hand tools. |
| ☐ | 2. | Air contaminant detectors or recorders, combustion controllers or shutoffs. |
| ☒ | 3. | Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment. |
| ☒ | 4. | Bathroom/toilet vent emissions. |
| ☒ | 5. | Batteries and battery charging stations, except at battery manufacturing plants. |
| ☐ | 6. | Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description. |
| ☐ | 7. | Blacksmith forges. |
| ☐ | 8. | Boiler water treatment operations, not including cooling towers. |
| ☒ | 9. | Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source. |
| ☐ | 10. | $CO_2$ lasers, used only on metals and other materials which do not emit HAP in the process. |
| ☒ | 11. | Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources. |
| ☒ | 12. | Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel. |
| ☒ | 13. | Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment. |
| ☐ | 14. | Demineralized water tanks and demineralizer vents. |
| ☐ | 15. | Drop hammers or hydraulic presses for forging or metalworking. |
| ☐ | 16. | Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam. |
| ☐ | 17. | Emergency (backup) electrical generators at residential locations. |
| ☐ | 18. | Emergency road flares. |

| 24. Insignificant Activities (Check all that apply) | | |
|---|---|---|
| ☒ | 19. | Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, $NO_x$, $SO_2$, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis: (see table below) |

| Emission Unit[a] | VOC PPH | VOC TPY |
|---|---|---|
| T-M-2 (Transmix Fuel Storage) | 0.35 | 1.51 |
| T-M-3 (Transmix Fuel Storage) | 0.35 | 1.51 |
| Butane Storage Tank 1 (Pressurized Vessel) | 0 | 0 |
| Butane Storage Tank 2 (Pressurized Vessel) | 0 | 0 |
| Tank K2 | 0.17 | 0.76 |
| Tank K3 | 0.17 | 0.76 |
| Gasoline Filter Change Outs[b] | 1.63 | 4.9E-03 |
| Tank 202 (Distillate Fuel Storage) | 0.20 | 0.9 |
| Tank 300 (Distillate Fuel Storage) | 2.7E-03 | 1.2E-03 |
| Tank 301 (Distillate Fuel Storage) | 1.6E-03 | 7.2E-03 |
| RA-1-302 (Distillate Additive Storage) | 2.2E-04 | 9.8E-04 |
| Diesel Fueling Station/Refuel Tank[b] | 0.60 | 0.3 |

[a] These emission units are not a source of $NO_X$, $SO_2$, CO, or PM
[b] Emissions presented are lb/event, not lb/hr

| | | |
|---|---|---|
| ☒ | 20. | Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27. Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis: (see table below) |

| Emission Unit | Total HAP PPH | Total HAP TPY |
|---|---|---|
| T-M-2 (Transmix Fuel Storage) | 1.8E-02 | 7.9E-02 |
| T-M-3 (Transmix Fuel Storage) | 1.8E-02 | 7.9E-02 |
| Tank K2 | 9.0E-03 | 3.9E-02 |
| Tank K3 | 9.0E-03 | 3.9E-02 |
| Gasoline Filter Change Outs[a] | 8.5E-02 | 2.5E-04 |
| Tank 202 (Distillate Fuel Storage) | 2.5E-03 | 1.1E-02 |
| Tank 300 (Distillate Fuel Storage) | 2.7E-04 | 1.2E-03 |
| Tank 301 (Distillate Fuel Storage) | 3.4E-04 | 1.5E-03 |
| RA-1-302 (Distillate Additive Storage) | 2.2E-04 | 9.8E-04 |
| Diesel Fueling Station/Refuel Tank[a] | 7.7E-03 | 4.2E-03 |

[a]Emissions presented are lb/event, not lb/hr

| | | |
|---|---|---|
| ☐ | 21. | Environmental chambers not using hazardous air pollutant (HAP) gases. |
| ☒ | 22. | Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption. |
| ☐ | 23. | Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating |

| 24. Insignificant Activities (Check all that apply) | | |
|---|---|---|
| | | equipment. |
| ☒ | 24. | Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis. |
| ☐ | 25. | Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP. |
| ☒ | 26. | Fire suppression systems. |
| ☒ | 27. | Firefighting equipment and the equipment used to train firefighters. |
| ☐ | 28. | Flares used solely to indicate danger to the public. |
| ☒ | 29. | Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted. |
| ☒ | 30. | Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation. |
| ☒ | 31. | Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic. |
| ☐ | 32. | Humidity chambers. |
| ☒ | 33. | Hydraulic and hydrostatic testing equipment. |
| ☒ | 34. | Indoor or outdoor kerosene heaters. |
| ☒ | 35. | Internal combustion engines used for landscaping purposes. |
| ☐ | 36. | Laser trimmers using dust collection to prevent fugitive emissions. |
| ☐ | 37. | Laundry activities, except for dry-cleaning and steam boilers. |
| ☐ | 38. | Natural gas pressure regulator vents, excluding venting at oil and gas production facilities. |
| ☐ | 39. | Oxygen scavenging (de-aeration) of water. |
| ☐ | 40. | Ozone generators. |
| ☒ | 41. | Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.) |
| ☒ | 42. | Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device. |
| ☐ | 43. | Process water filtration systems and demineralizers. |
| ☒ | 44. | Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification. |
| ☒ | 45. | Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified. |
| ☐ | 46. | Routing calibration and maintenance of laboratory equipment or other analytical instruments. |
| ☐ | 47. | Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers. |
| ☐ | 48. | Shock chambers. |
| ☐ | 49. | Solar simulators. |
| ☒ | 50. | Space heaters operating by direct heat transfer. |

| 24. Insignificant Activities (Check all that apply) | | |
|---|---|---|
| ☐ | 51. | Steam cleaning operations. |
| ☐ | 52. | Steam leaks. |
| ☐ | 53. | Steam sterilizers. |
| ☒ | 54. | Steam vents and safety relief valves. |
| ☐ | 55. | Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized. |
| ☒ | 56. | Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list. |
| ☒ | 57. | Such other sources or activities as the Director may determine. |
| ☒ | 58. | Tobacco smoking rooms and areas. |
| ☒ | 59. | Vents from continuous emissions monitors and other analyzers. |

*Section 5: Emission Units, Control Devices, and Emission Points*

| **25. Equipment Table** |
|---|
| Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**. |
| **26. Emission Units** |
| For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**. |
| For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**. |
| **27. Control Devices** |
| For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**. |
| For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**. |

*Section 6: Certification of Information*

**28. Certification of Truth, Accuracy and Completeness and Certification of Compliance**

*Note: This Certification must be signed by a responsible official. The **original**, signed in **blue ink**, must be submitted with the application. Applications without an **original** signed certification will be considered as incomplete.*

**a. Certification of Truth, Accuracy and Completeness**

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

**b. Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

**Responsible official (type or print)**

| | |
|---|---|
| Name: Angela Brown | Title: Vice President |

**Responsible official's signature:**

Signature: Angela Brown Signature Date: Sept 23, 2019

(Must be signed and dated in blue ink)

| Note: Please check all applicable attachments included with this permit application: | |
|---|---|
| ☒ | ATTACHMENT A: Area Map |
| ☒ | ATTACHMENT B: Plot Plan(s) |
| ☒ | ATTACHMENT C: Process Flow Diagram(s) |
| ☒ | ATTACHMENT D: Equipment Table |
| ☒ | ATTACHMENT E: Emission Unit Form(s) |
| ☐ | ATTACHMENT F: Schedule of Compliance Form(s) |
| ☒ | ATTACHMENT G: Air Pollution Control Device Form(s) |
| ☒ | ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s) |

***All of the required forms and additional information can be found and downloaded from, the DEP website at*** www.dep.wv.gov/daq, ***requested by phone (304) 926-0475, and/or obtained through the mail.***

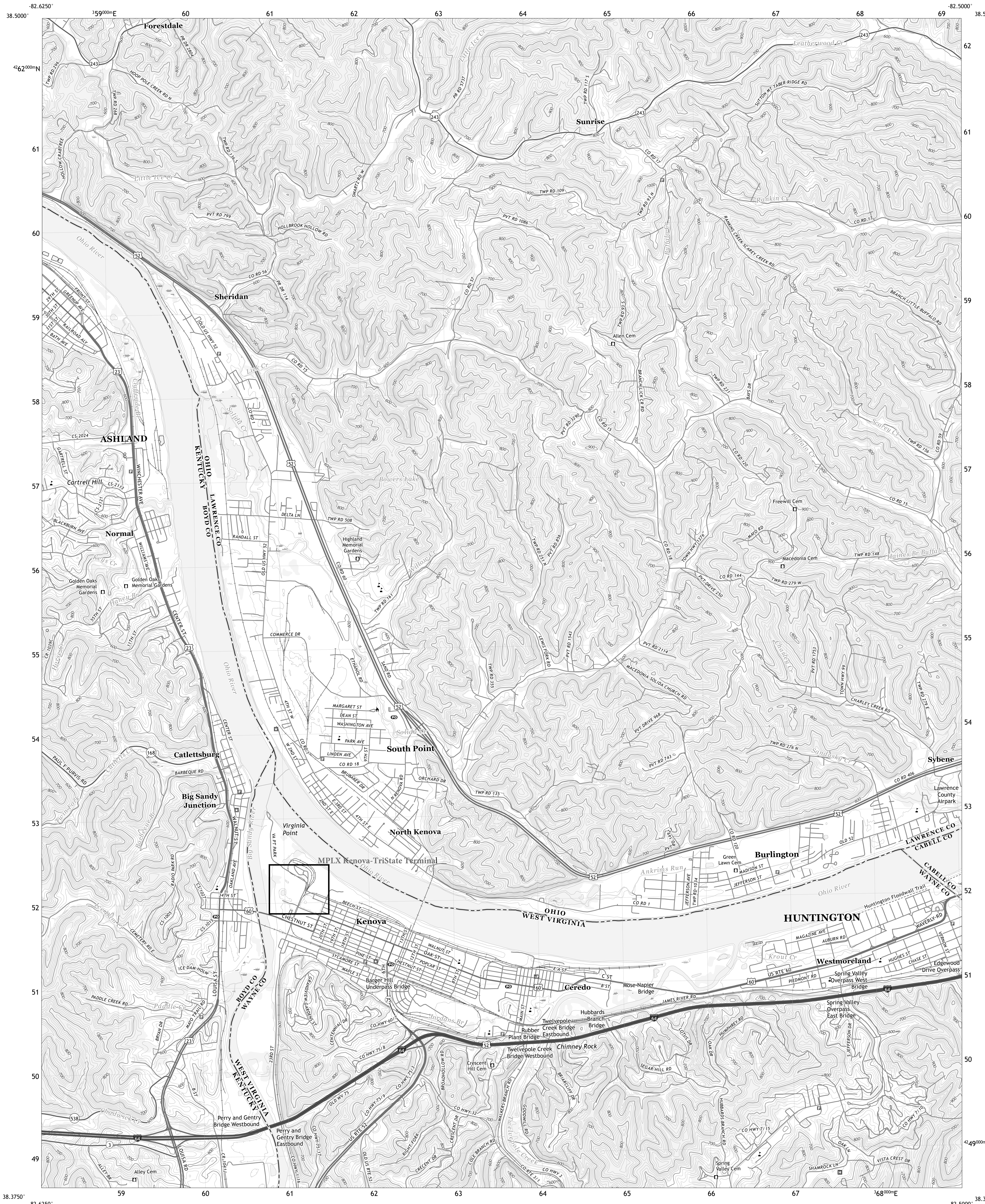
# APPENDIX A – AREA MAP

USGS science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

# CATLETTSBURG QUADRANGLE
KENTUCKY - OHIO - WEST VIRGINIA
7.5-MINUTE SERIES




**Produced by the United States Geological Survey**
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 17S

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....................................................NAIP, June 2015 - September 2016
Roads....................................... U.S. Census Bureau, 2016
Names......................................................................GNIS, 1979 - 2018
Hydrography..............................National Hydrography Dataset, 2000 - 2019
Contours..........................................National Elevation Dataset, 2004 - 2010
Boundaries.............Multiple sources; see metadata file 2017 - 2018
Public Land Survey System.............................................BLM, 2015
Wetlands................FWS National Wetlands Inventory 1983 - 2007

MN
GN
7°13´
128 MILS
0°58´
17 MILS

UTM GRID AND 2019 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
LC
Grid Zone Designation
17S

SCALE 1:24 000

KILOMETERS
METERS
MILES
FEET

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

KENTUCKY
QUADRANGLE LOCATION

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | | 5 |
| 6 | 7 | 8 |

1 Ironton
2 Kitts Hill
3 Aid
4 Ashland
5 Huntington
6 Boltsfork
7 Burnaugh
8 Lavalette

ADJOINING QUADRANGLES

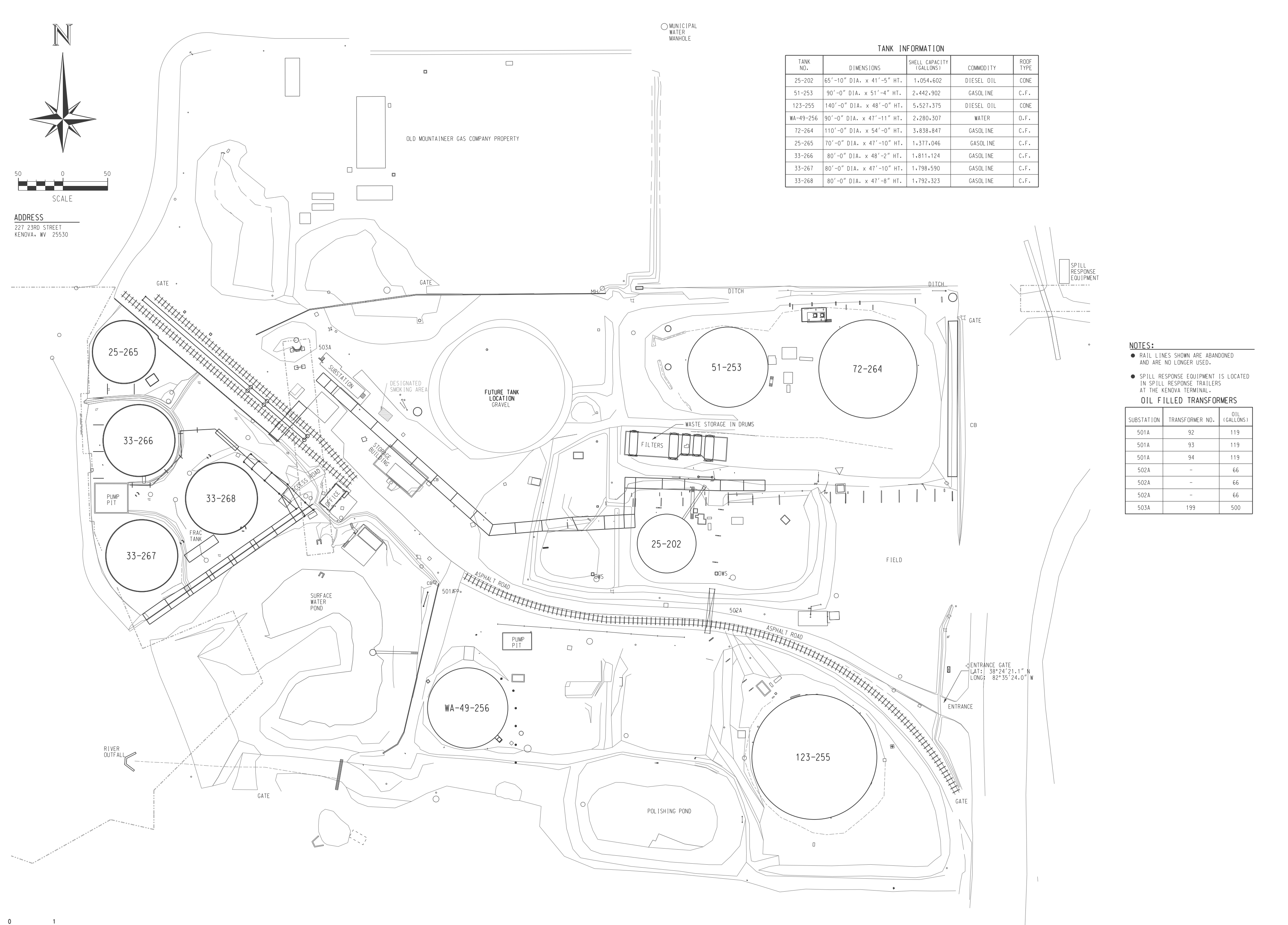
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

**CATLETTSBURG, KY, OH, WV**
**2019**

NSN. 7643016368094
NGA REF NO. USGSX24K7675

# APPENDIX B - PLOT PLAN

MPLXT has not started constructing the equipment for the butane blending activities that MPLXT submitted a TV off permit change for in December, therefore the plot plans provided do not include these processes.




## TANK INFORMATION

| TANK NO. | DIMENSIONS | SHELL CAPACITY (GALLONS) | COMMODITY | ROOF TYPE |
|---|---|---|---|---|
| 25-202 | 65'-10" DIA. x 41'-5" HT. | 1,054,602 | DIESEL OIL | CONE |
| 51-253 | 90'-0" DIA. x 51'-4" HT. | 2,442,902 | GASOLINE | C.F. |
| 123-255 | 140'-0" DIA. x 48'-0" HT. | 5,527,375 | DIESEL OIL | CONE |
| WA-49-256 | 90'-0" DIA. x 47'-11" HT. | 2,280,307 | WATER | O.F. |
| 72-264 | 110'-0" DIA. x 54'-0" HT. | 3,838,847 | GASOLINE | C.F. |
| 25-265 | 70'-0" DIA. x 47'-10" HT. | 1,377,046 | GASOLINE | C.F. |
| 33-266 | 80'-0" DIA. x 48'-2" HT. | 1,811,124 | GASOLINE | C.F. |
| 33-267 | 80'-0" DIA. x 47'-10" HT. | 1,798,590 | GASOLINE | C.F. |
| 33-268 | 80'-0" DIA. x 47'-8" HT. | 1,792,323 | GASOLINE | C.F. |

## NOTES:

- RAIL LINES SHOWN ARE ABANDONED AND ARE NO LONGER USED.
- SPILL RESPONSE EQUIPMENT IS LOCATED IN SPILL RESPONSE TRAILERS AT THE KENOVA TERMINAL.

## OIL FILLED TRANSFORMERS

| SUBSTATION | TRANSFORMER NO. | OIL (GALLONS) |
|---|---|---|
| 501A | 92 | 119 |
| 501A | 93 | 119 |
| 501A | 94 | 119 |
| 502A | - | 66 |
| 502A | - | 66 |
| 502A | - | 66 |
| 503A | 199 | 500 |

| NO | DATE | DFTR. | REVISIONS | DSNR. |
|---|---|---|---|---|
| 1 | 05-16-12 | ETM | REVISED ENTIRE SHEET | KMM |
| 2 | 09-29-14 | (TFC) | TE-DRF-0615: REMOVED OUT OF SERVICE ASSETS | - |
| 3 | 11-19-14 | MSW(EN) | 2014 EQUIPMENT FILE UPDATES - EN ENGINEERING | - |
| 4 | 02-11-16 | ETM | REVISED TANK INFO. CHART PER OIS SHELL CAPACITY | KMM |
| 5 | 4-4-18 | RWD | PUMP FOUNDATIONS AT TANKS 202,255,253,264 | JK |
| - | - | - | - | - |
| - | - | - | - | - |
| - | - | - | - | - |

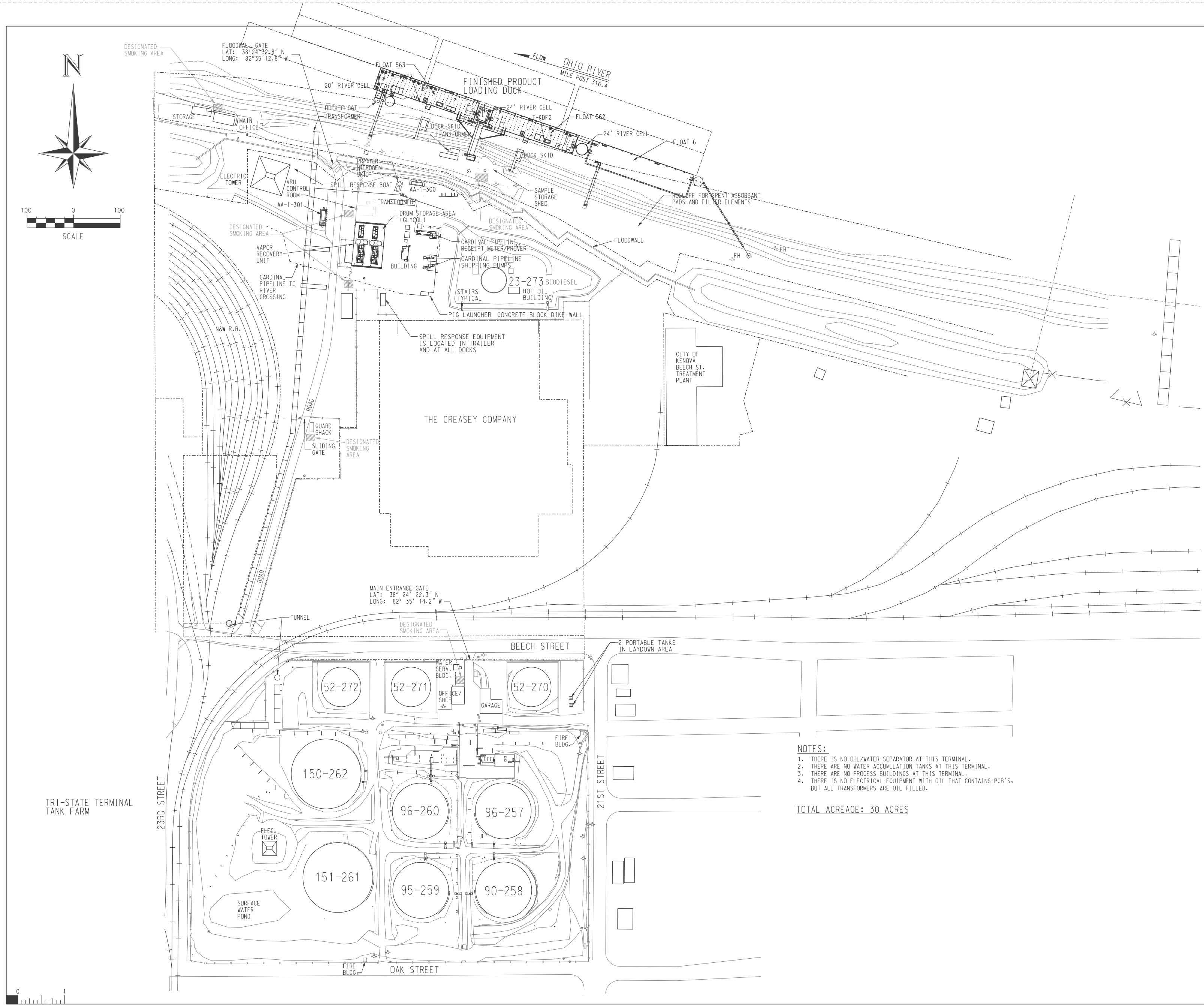


MARATHON®

SITE DIAGRAM

KENOVA, WV (TRI-STATE) TERMINAL

| | |
|---|---|
| SCALE | 1"=50'-0" |
| DATE | 12-22-09 |
| DRAFTER | R.T. BISHOP |
| DESIGNER | |
| AFE | |
| | |
| CORE NO | 109-01080-01-FRP |
| DWG NO | UNIT-DWG-SHT-TYPE<br>109-01080-01-FRP |




TANK INFORMATION

| TANK NO. | DIMENSIONS | SHELL CAPACITY (GALLONS) | COMMODITY | ROOF TYPE |
|---|---|---|---|---|
| 96-257 | 120'-0" DIA. x 55'-0" HT. | 4,653,148 | GASOLINE | C.F. |
| 90-258 | 120'-0" DIA. x 52'-0" HT. | 4,399,339 | GASOLINE | C.F. |
| 95-259 | 120'-0" DIA. x 55'-0" HT. | 4,653,148 | GASOLINE | C.F. |
| 96-260 | 120'-0" DIA. x 58'-11" HT. | 4,984,508 | GASOLINE | C.F. |
| 151-261 | 150'-0" DIA. x 50'-2" HT. | 6,631,616 | NO. 2 DIESEL OIL | CONE |
| 150-262 | 150'-0" DIA. x 50'-2" HT. | 6,631,616 | NO. 2 DIESEL OIL | CONE |
| 52-270 | 85'-0" DIA. x 56'-0" HT. | 2,377,100 | GASOLINE | C.F. |
| 52-271 | 85'-0" DIA. x 56'-0" HT. | 2,377,100 | GASOLINE | C.F. |
| 52-272 | 85'-0" DIA. x 56'-0" HT. | 2,377,100 | NO. 2 DIESEL OIL | C.F. |
| 23-273 | 54'-0" DIA. x 56'-0" HT. | 959,394 | BIO-DIESEL | CONE |
| T-KDF2 | 5'-4" DIA. x 12'-0" LG. | 2,005 | WATER | HORIZ. |
| T-KDF3 | 5'-4" DIA. x 12'-0" LG. | 2,005 | WATER | HORIZ. |
| T-LOD2 | 4'-0" DIA. x 10'-8" LG. | 1,003 | TRANSMIX | HORIZ. |
| AA-1-300 | 5'-3" DIA. x 24'-0" LG. | 3,886 | DIESEL DYE | HORIZ. |
| AA-1-301 | 8'-0" DIA. x 21'-4" LG. | 8,022 | ADDITIVE | HORIZ. |
| RA-1-302 | 4'-0" DIA. x 6'-0" LG. | 564 | DIESEL DYE | HORIZ. |

NOTES:

1. THERE IS NO OIL/WATER SEPARATOR AT THIS TERMINAL.
2. THERE ARE NO WATER ACCUMULATION TANKS AT THIS TERMINAL.
3. THERE ARE NO PROCESS BUILDINGS AT THIS TERMINAL.
4. THERE IS NO ELECTRICAL EQUIPMENT WITH OIL THAT CONTAINS PCB'S, BUT ALL TRANSFORMERS ARE OIL FILLED.

TOTAL ACREAGE: 30 ACRES

| NO | DATE | DFTR. | REVISIONS | DSNR. |
|---|---|---|---|---|
| 14 | 02-03-14 | ETM | REVISED TANK NUMBERS & TANK INFORMATION CHART: ADDED SPENT ABSORBANT PAD ROLLOFF | KMM |
| 15 | 01-13-16 | ETM | REVISED TANK INFORMATION CHART PER OIS UPDATES | KMM |
| 16 | 11-7-16 | ALM | M20145882: ADDED PRAXAIR NITROGEN SKID | JK |
| 17 | 03-27-17 | ETM | REV. TANK INFORMATION CHART PER SHELL CAPACITY | KMM |
| 18 | 12-4-17 | ALM | M20167534-001: ADDED DOCK FLOAT | MSJ |
| 19 | 11-5-18 | ALM | 51295: ADDED RELIEF JUMBER BETWEEN TKS 259 & 260 | JK |



MARATHON®

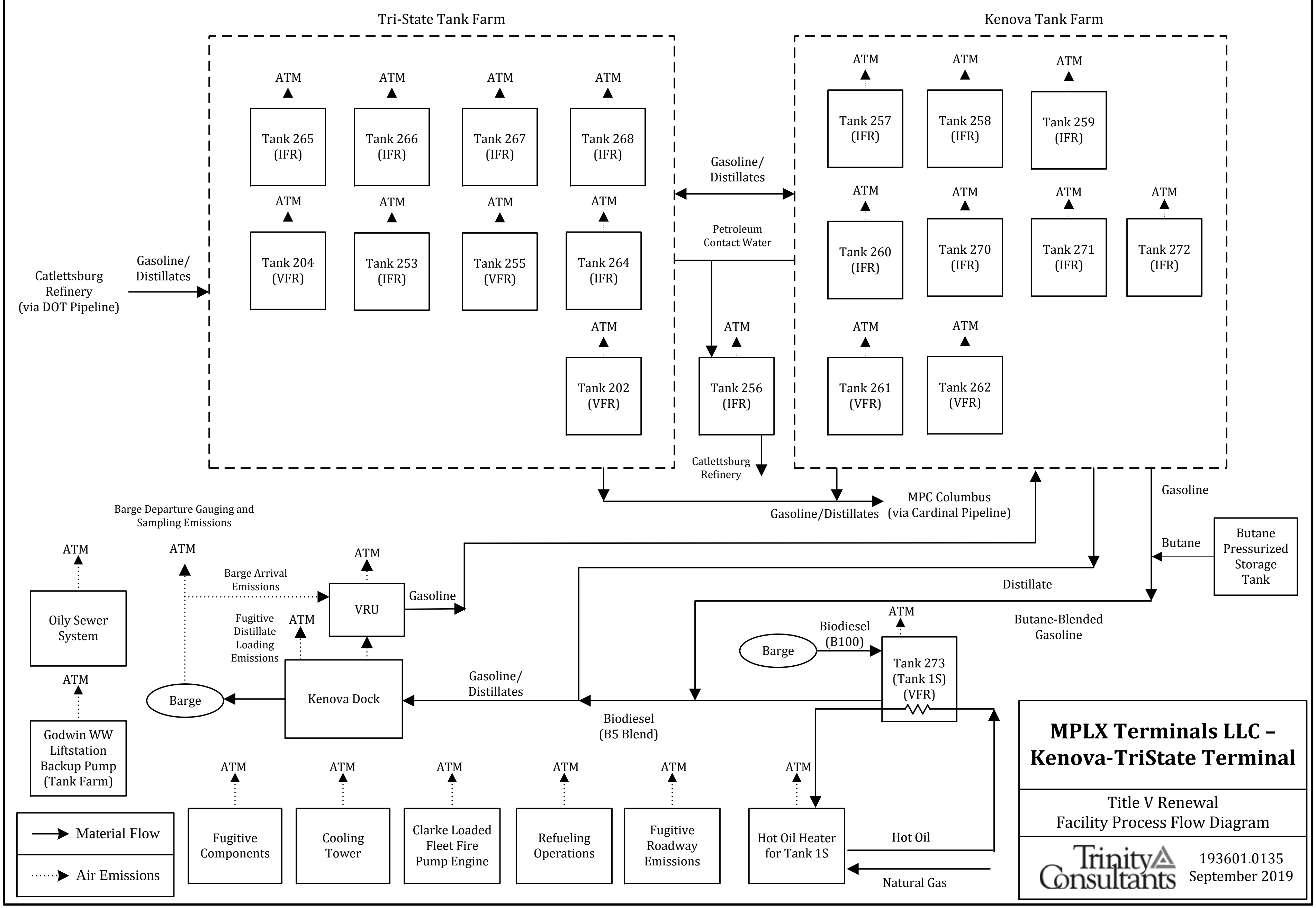
SITE DIAGRAM
(SHEET 1 OF 3)

KENOVA, WV TERMINAL

| | |
|---|---|
| SCALE | 1"=100'-0" |
| DATE | 9-11-01 |
| DRAFTER | B.K. PRICHARD |
| DESIGNER | |
| AFE | |
| CORE NO | 079-01080-01-FRP |
| | UNIT-DWG-SHT-TYPE |
| DWG NO | 079-01080-01-FRP |

# APPENDIX C – PROCESS FLOW DIAGRAM

# Process Flow Diagram for the Kenova-TriState Terminal



# APPENDIX D – WVDEP TITLE V EQUIPMENT TABLE

## ATTACHMENT D - Title V Equipment Table

**(includes all emission units at the facility except those designated as insignificant activities in Section 4, Item 24 of the General Forms)**

| Emission Point ID[1] | Control Device[1] | Emission Unit ID[1] | Emission Unit Description | Design Capacity[2] | Year Installed/ Modified |
|---|---|---|---|---|---|
| Tank 253 | N/A | Tank 253 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 2,444,400 gallons | 1948/1992 |
| Tank 255 | N/A | Tank 255 | Vertical Fixed Roof Distillate Fuel Storage Tank | 5,527,200 gallons | 1948 |
| Tank 256 | N/A | Tank 256 | External Floating Roof Petroleum Wastewater Storage Tank | 2,280,600 gallons | 1949 |
| Tank 257 | N/A | Tank 257 | Internal Floating Roof Gasoline Storage Tank | 4,653,600 gallons | 1951/1995 |
| Tank 258 | N/A | Tank 258 | Internal Floating Roof Gasoline Storage Tank | 4,397,400 gallons | 1951/1997 |
| Tank 259 | N/A | Tank 259 | Internal Floating Roof Gasoline Storage Tank | 4,653,600 gallons | 1951/2001 |
| Tank 260 | N/A | Tank 260 | Internal Floating Roof Gasoline Storage Tank | 4,985,400 gallons | 1968/2002 |
| Tank 261 | N/A | Tank 261 | Fixed Cone Roof Distillate Storage Tank | 6,631,800 gallons | 1968/1992 |
| Tank 262 | N/A | Tank 262 | Fixed Cone Roof Distillate Storage Tank | 6,631,800 gallons | 1971 |
| Tank 264 | N/A | Tank 264 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 3,838,800 gallons | 1990 |
| Tank 265 | N/A | Tank 265 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 1,377,600 gallons | 1991 |
| Tank 266 | N/A | Tank 266 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 1,810,200 gallons | 1993 |
| Tank 267 | N/A | Tank 267 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 1,797,600 gallons | 1993 |
| Tank 268 | N/A | Tank 268 | Internal Fixed Roof Gasoline/Distillate Fuel Storage Tank | 1,793,400 gallons | 1993 |
| Tank 270 | N/A | Tank 270 | Internal Floating Roof Gasoline/Distillate Storage Tank | 2,377,200 gallons | 2001 |
| Tank 271 | N/A | Tank 271 | Internal Floating Roof Gasoline/Distillate Storage Tank | 2,377,200 gallons | 2001 |
| Tank 272 | N/A | Tank 272 | Internal Floating Roof Gasoline/Distillate Storage Tank | 2,377,200 gallons | 2001 |

| Emission Point ID[1] | Control Device[1] | Emission Unit ID[1] | Emission Unit Description | Design Capacity[2] | Year Installed/ Modified |
|---|---|---|---|---|---|
| Tank 273 | N/A | Tank 273 | Cone Roof Storage Tank (Fixed Roof) - Biodiesel / #2 Distillate | 957,600 gallons | 2012 |
| Barge Loading Stations 1-8 | VRU (when loading gasoline) | Barge Loading Stations 1-8 | Marine Vessel loading Operations (Gasoline/Distillate/Biodiesel) | **Maximum Simultaneous Loading:** 19,600 bbl/hr | N/A |
| Barge Arrival/Departure Gauging and Sampling | VRU (for dockside arrival emissions) | Barge Arrival/Departure Gauging and Sampling | Emissions from depressurizing a barge upon arrival at the dock and after loading the vessel, as well as any sampling or gauging activities deemed necessary. | N/A | N/A |
| LDAR | N/A | LDAR | Fugitive Equipment Leaks | N/A | N/A |
| Hot Oil Heater #1 | N/A | Hot Oil Heater #1 | Hot Oil Heater for Tank 273 | 2.499 MMBtu/hr | 2012 |
| Engine #4 | N/A | Engine #4 | Clarke Loaded Fleet Fire Pump Engine | 510 hp | 2015 |
| Engine #5 | N/A | Engine #5 | Godwin WW Liftstation Backup Pump | 66 hp | 2018 |
| Oily Sewer System | N/A | Oily Sewer System | Oily Water Sewer System | N/A | N/A |
| Cooling Tower #1 | N/A | Cooling Tower | Cooling Tower | 400 gpm | N/A |
| Roadways | N/A | Roadways | Paved Facility Roadways | N/A | N/A |

[1]For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S,... or other appropriate description for emission units; 1C, 2C, 3C,... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

[2]For tanks, the design capacity provided is the shell capacity.

# APPENDIX E - WVDEP TITLE V EMISSION UNIT FORM

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:** Roadways | **Emission unit name:** Roadways | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Paved facility roadways and parking areas | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** N/A | **Installation date:** N/A | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** N/A | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 14,657 VMT/yr | **Maximum Operating Schedule:** 8,760 hr/yr |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | 2.16E-03 | 0.01 |
| Particulate Matter ($PM_{10}$) | 7.29E-03 | 0.03 |
| Total Particulate Matter (TSP) | 3.36E-02 | 0.15 |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | N/A | N/A |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | N/A | N/A |
| Ethylbenzene | N/A | N/A |
| Hexane | N/A | N/A |
| Toluene | N/A | N/A |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | N/A | N/A |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Emissions estimated in accordance with assumptions regarding facility traffic patterns and the methods provided in AP-42 Section 13.2.1 (January 2011 and November 2006). Hourly emissions based on annual emissions divided by 8,760 hr/yr.

| *Applicable Requirements* |
| --- |
| **List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**<br><br>The owner or operator of a plant shall maintain particulate matter control of the plant premises, and plant owned, leased or controlled access roads, by paving, application of asphalt, chemical dust suppressants or other suitable dust control measures. Good operating practices shall be implemented and when necessary particulate matter suppressants shall be applied in relation to stockpiling and general material handling to minimize particulate matter generation and atmospheric entrainment. **[45CSR7-5.2]** |
| __X__ Permit Shield |
| **For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**<br><br>MPLXT has paved all employee parking areas and roads accessed by additive or other delivery trucks. |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br><br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

***Emission Unit Description***

| **Emission unit ID number:** | **Emission unit name:** | **List any control devices associated with this emission unit:** N/A |
|---|---|---|
| Oily Sewer System | Oily Sewer System | |

**Provide a description of the emission unit (type, method of operation, design parameters, etc.):**
System of sumps, drains, junction boxes, etc. which diverts stormwater and process wastewater to Tank 256

| **Manufacturer:** | **Model number:** | **Serial number:** |
|---|---|---|
| N/A | N/A | N/A |
| **Construction date:** | **Installation date:** | **Modification date(s):** |
| N/A | N/A | N/A |

**Design Capacity (examples: furnaces - tons/hr, tanks - gallons):**
N/A

| **Maximum Hourly Throughput:** | **Maximum Annual Throughput:** | **Maximum Operating Schedule:** |
|---|---|---|
| N/A | N/A | 8,760 hrs/yr |

***Fuel Usage Data* (fill out all applicable fields)**

**Does this emission unit combust fuel?** ☐ Yes ☒ No

**If yes, is it?**
☐ Indirect Fired ☐ Direct Fired

**Maximum design heat input and/or maximum horsepower rating:**
N/A

**Type and Btu/hr rating of burners:**
N/A

**List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**
N/A

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 5.54 | 24.3 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 0.04 | 0.18 |
| Ethylbenzene | 0.04 | 0.17 |
| Hexane (-n) | 0.20 | 0.88 |
| Toluene | 0.14 | 0.61 |
| Trimethylpentane (2,2,4) | 0.15 | 0.64 |
| Xylene | 0.15 | 0.66 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Emissions estimates based on EPA's Refinery Wastewater Emissions Tool (RWET) (11/2010) using available sample data for benzene in the wastewater exiting Tank 256 and applying the ratios provided in Table 7-9 of "Emission Estimation Protocol for Petroleum Refineries: Version 2.1.1" for HAPs present in gasoline or distillate. Refer to Attachment I for detailed emissions calculations.

| *Applicable Requirements* |
| --- |
| **List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**<br><br>N/A |
| __X__ Permit Shield |
| **For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**<br><br>N/A |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br><br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:**<br>LDAR | **Emission unit name:**<br>LDAR | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Fugitive component equipment leaks (valves, connectors, pump seals, etc.) | | |
| **Manufacturer:**<br>N/A | **Model number:**<br>N/A | **Serial number:**<br>N/A |
| **Construction date:**<br>N/A | **Installation date:**<br>N/A | **Modification date(s):**<br>N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):**<br>N/A | | |
| **Maximum Hourly Throughput:**<br>N/A | **Maximum Annual Throughput:**<br>N/A | **Maximum Operating Schedule:**<br>8760 hrs/yr |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 0.43 | 1.88 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 2.09E-03 | 9.13E-03 |
| Ethylbenzene | 3.04E-04 | 1.33E-03 |
| Hexane (-n) | 3.66E-03 | 1.60E-02 |
| Toluene | 3.45E-03 | 1.51E-02 |
| Trimethylpentane (2,2,4) | 1.82E-03 | 7.97E-03 |
| Xylene | 2.46E-03 | 1.08E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Fugitive piping component emissions estimates are based on facility-wide fugitive component counts and factors from "EPA Protocol for Equipment Leak Emission Estimates," Table 2-3: Marketing Terminal Average Emission Factors (November 1995). There are no emission factors for components in heavy liquid service (i.e., distillate); therefore, light liquid emission factors are utilized for components in heavy liquid service.

Fugitive emissions also result from disconnecting the truck hose after butane offloading is completed. Upon disconnect, a small quantity of VOC is emitted from each connector as a result of the residual butane in the hose. The amount of loss per disconnect event can be estimated using the number of hose connectors disconnected per event, and the amount of loss from each connector. The annual emissions estimate are based off the estimated number of transport trucks required to offload the maximum amount of butane the site could process in a year and the average butane load per truck. The short term emissions estimate assume a maximum of one disconnect event per hour from truck offloading.

Refer to Attachment I for detailed emission calculations.

*Applicable Requirements*

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

| Requirement Citation | Requirement Text |
|---|---|
| 40 CFR 63.424(a) | Each owner or operator of a bulk gasoline terminal or pipeline breakout station subject to the provisions of this subpart shall perform a monthly leak inspection of all equipment in gasoline service. For this inspection, detection methods incorporating sight, sound, and smell are acceptable. Each piece of equipment shall be inspected during the loading of a gasoline cargo tank. |
| 40 CFR 63.424(c) | When a leak is detected, an initial attempt at repair shall be made as soon as practicable, but no later than 5 calendar days after the leak is detected. Repair or replacement of leaking equipment shall be completed within 15 calendar days after detection of each leak, except as provided in paragraph (d) of this section. |
| 40 CFR 63.424(d) | Delay of repair of leaking equipment will be allowed upon a demonstration to the Administrator that repair within 15 days is not feasible. The owner or operator shall provide the reason(s) a delay is needed and the date by which each repair is expected to be completed. |
| 40 CFR 63.424(e) | Initial compliance with the requirements in paragraphs (a) through (d) of this section shall be achieved by existing sources as expeditiously as practicable, but no later than December 15, 1997. For new sources, initial compliance shall be achieved upon startup. |
| 40 CFR 63.424(f) | As an alternative to compliance with the provisions in paragraphs (a) through (d) of this section, owners or operators may implement an instrument leak monitoring program that has been demonstrated to the Administrator as at least equivalent. |
| 40 CFR 63.424(g) | Owners and operators shall not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to, the following:<br><br>63.424(g)(1)<br>Minimize gasoline spills;<br><br>63.424(g)(2)<br>Clean up spills as expeditiously as practicable;<br><br>63.424(g)(3)<br>Cover all open gasoline containers with a gasketed seal when not in use;<br><br>63.424(g)(4)<br>Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators. |

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

| Requirement Citation | Requirement Text |
|---|---|
| 40 CFR 63.424(b) | A log book shall be used and shall be signed by the owner or operator at the completion of each inspection. A section of the log shall contain a list, summary description, or diagram(s) showing the location of all equipment in gasoline service at the facility. |
| 40 CFR 63.424(c) | Each detection of a liquid or vapor leak shall be recorded in the log book. |
| 40 CFR 63.428(e) | Each owner or operator complying with the provisions of §63.424 (a) through (d) shall record the following information in the log book for each leak that is detected:<br><br>63.428(e)(1)<br>The equipment type and identification number;<br><br>63.428(e)(2)<br>The nature of the leak (i.e., vapor or liquid) and the method of detection (i.e., sight, sound, or smell);<br><br>63.428(e)(3)<br>The date the leak was detected and the date of each attempt to repair the leak;<br><br>63.428(e)(4)<br>Repair methods applied in each attempt to repair the leak;<br><br>63.428(e)(5)<br>“Repair delayed” and the reason for the delay if the leak is not repaired within 15 calendar days after discovery of the leak;<br><br>63.428(e)(6)<br>The expected date of successful repair of the leak if the leak is not repaired within 15 days; and<br><br>63.428(e)(7)<br>The date of successful repair of the leak. |
| 40 CFR 63.428(g)(3) | Each owner or operator of a bulk gasoline terminal or pipeline breakout station subject to the provisions of this subpart shall include in a semiannual report to the Administrator the following information, as applicable:<br><br>63.428(g)(3)<br>The number of equipment leaks not repaired within 5 days after detection. |
| 40 CFR 63.428(h)(4) | For each occurrence of an equipment leak for which no repair attempt was made within 5 days or for which repair was not completed within 15 days after detection:<br><br>63.428(h)(4)(i)<br>The date on which the leak was detected;<br><br>63.428(h)(4)(ii)<br>The date of each attempt to repair the leak;<br><br>63.428(h)(4)(iii)<br>The reasons for the delay of repair; and<br><br>63.428(h)(4)(iv)<br>The date of successful repair. |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | | |
|---|---|---|---|
| **Emission unit ID number:** Hot Oil Heater #1 | **Emission unit name:** Tank 273 Hot Oil Heater | **List any control devices associated with this emission unit:** N/A | |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** 2.499 MMBtu/hr natural gas-fired heater used to heat oil which maintains temperature of biodiesel storage tank (Tank 273) | | | |
| **Manufacturer:** HEATEC | **Model number:** HCS-175 H11-130 | **Serial number:** N/A | |
| **Construction date:** 2011 | **Installation date:** 2012 | **Modification date(s):** N/A | |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2.499 MMBtu/hr | | | |
| **Maximum Hourly Throughput:** 2.38E-03 MMscf/hr | **Maximum Annual Throughput:** 20.8 MMscf/yr | **Maximum Operating Schedule:** 8,760 hrs/yr | |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | | |
| **Does this emission unit combust fuel?** ☒ Yes ☐ No | | **If yes, is it?** ☒ Indirect Fired ☐ Direct Fired | |
| **Maximum design heat input and/or maximum horsepower rating:** 2.499 MMBtu/hr | | **Type and Btu/hr rating of burners:** N/A | |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** Natural Gas | | | |
| **Describe each fuel expected to be used during the term of the permit.** | | | |
| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
| Natural Gas | $SO_2$ emission factor of 0.6 lb/MMscf per AP-42 | N/A | 1,020 Btu/scf |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | 0.206 | 0.901 |
| Nitrogen Oxides ($NO_X$) | 0.245 | 1.073 |
| Lead (Pb) | 1.23E-06 | 5.37E-06 |
| Particulate Matter ($PM_{2.5}$) | 0.0186 | 0.0816 |
| Particulate Matter ($PM_{10}$) | 0.0186 | 0.0816 |
| Total Particulate Matter (TSP) | 0.005 | 0.02 |
| Sulfur Dioxide ($SO_2$) | 0.0015 | 0.0064 |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 0.013 | 0.059 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.15E-06 | 2.25E-05 |
| Ethylbenzene | N/A | N/A |
| Hexane | 4.41E-03 | 1.93E-02 |
| Toluene | 8.33E-06 | 3.65E-05 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | N/A | N/A |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |
| **List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**<br><br>AP-42 Section 1.4, Tables 1.4-2 and 1.4-3. Refer to attachment I for detailed emission calculations. | | |

*Applicable Requirements*

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

As noted in the application narrative, MPLXT revised the facility-wide potential emissions to incorporate the dock arrival and dock departure barge gauging/sampling emissions. When considering these emissions as a part of the facility-wide potential emissions, the Kenova-TriState Terminal has the potential to emit total and individual HAP in quantities greater than 25 and 10 tpy respectively. Therefore, upon submittal of this renewal application, the facility will be considered a major source of HAP. MPLXT proposes a period of three (3) years after submitting this renewal application to comply with the newly applicable provisions of 40 CFR 63, Subpart DDDDD for the heater, which is consistent with the timeframe specified in 40 CFR 63.7495(c)(2).

| Requirement Citation | Requirement |
|---|---|
| 45CSR2-3.1 | Emissions of smoke and/or particulate matter must not exceed ten (10) percent opacity based on a six-minute average |
| 45CSR2-10 | In the event of an unavoidable shortage of fuel having characteristics or specifications necessary for a fuel burning unit to comply with the visible emission standards set forth in section 3 or any emergency situation or condition creating a threat to public safety or welfare, the Director may grant an exception to the otherwise applicable visible emission standards for a period not to exceed fifteen (15) days, provided that visible emissions during the exception period do not exceed a maximum six (6) minute average of thirty (30) percent and that a reasonable demonstration is made by the owner or operator that the emission standards under section 4 will not be exceeded during the exemption period. |
| 40 CFR 63.7500(e) | Boilers and process heaters designed to burn gas 1 fuels with a heat input capacity of less than or equal to 5 million BTU per hour must complete a tune-up every 5 years as specified in 63.7540 |

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

MPLXT complies with smoke and PM emissions limitations by firing only gaseous fuel in this emissions unit.

| Requirement Citation | Requirement |
|---|---|
| 40 CFR 63.7545(b) | If you startup your affected source before January 31, 2013, you must submit an Initial Notification not later than 120 days after January 31, 2013. |
| 40 CFR 63.7545(f) | If you operate a unit designed to burn natural gas or other gas 1 fuels and you intend to burn a fuel other than gas 1 fuels during a period of natural gas curtailment or supply interruption, you must submit a notification of alternative fuel use within 48 hours of each period of natural gas curtailment or supply interruption as defined in 63.7575. |
| 40 CFR 63.7550(a) – Table 9 | You must submit a compliance report every 5 years detailing any deviations from the work practice standards in Table 3 to this subpart. |

| | |
|---|---|
| 40 CFR 63.7540(a)(12) | If your boiler or process heater has a continuous oxygen trim system that maintains an optimum air to fuel ratio, or a heat input capacity of less than or equal to 5 million Btu per hour and the unit is in the units designed to burn gas 1; units designed to burn gas 2 (other); or units designed to burn light liquid subcategories, or meets the definition of limited-use boiler or process heater in §63.7575, you must conduct a tune-up of the boiler or process heater every 5 years as specified in paragraphs (a)(10)(i) through (vi) of this section to demonstrate continuous compliance. You may delay the burner inspection specified in paragraph (a)(10)(i) of this section until the next scheduled or unscheduled unit shutdown, but you must inspect each burner at least once every 72 months. |
| 40 CFR 63.7540(a)(10)(i)-(vi) | 63.7540(a)(10)<br>(i) As applicable, inspect the burner, and clean or replace any components of the burner as necessary (you may perform the burner inspection any time prior to the tune-up or delay the burner inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the burner inspection until the first outage, not to exceed 36 months from the previous inspection. At units where entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment;<br>(ii) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available;<br>(iii) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (you may delay the inspection until the next scheduled unit shutdown). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection;<br>(iv) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any NOX requirement to which the unit is subject;<br>(v) Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer; and<br>(vi) Maintain on-site and submit, if requested by the Administrator, a report containing the information in paragraphs (a)(10)(vi)(A) through (C) of this section,<br>(A) The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater;<br>(B) A description of any corrective actions taken as a part of the tune-up; and<br>(C) The type and amount of fuel used over the 12 months prior to the tune-up, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel used by each unit. |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:**<br>Gasoline Barge Loading | **Emission unit name:**<br>Gasoline Barge Loading | **List any control devices associated with this emission unit:** VRU |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Gasoline Barge Loading | | |
| **Manufacturer:**<br>Marathon field constructed | **Model number:**<br>Marathon field constructed | **Serial number:**<br>N/A |
| **Construction date:**<br>N/A | **Installation date:**<br>N/A | **Modification date(s):**<br>N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 8 barges/day | | |
| **Maximum Hourly Throughput:**<br>13,600 bbl/hr (gasoline only) | **Maximum Annual Throughput:**<br>73 million bbl/yr Gasoline (if not loading distillate) | **Maximum Operating Schedule:**<br>8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 66.8 (gasoline only)<br>69.9 (worst-case loading) | 179.4 (gasoline only)<br>179.4 (worst-case loading) |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 0.60 (gasoline only)<br>0.63 (worst-case loading) | 1.61 (gasoline only)<br>1.61 (worst-case loading) |
| Ethylbenzene | 0.07 (gasoline only)<br>0.07 (worst-case loading) | 0.18 (gasoline only)<br>0.18 (worst-case loading) |
| Hexane | 1.07 (gasoline only)<br>1.12 (worst-case loading) | 2.87 (gasoline only)<br>2.87 (worst-case loading) |
| Toluene | 0.87 (gasoline only)<br>0.91 (worst-case loading) | 2.33 (gasoline only)<br>2.33 (worst-case loading) |
| Trimethylpentane (2,2,4) | 0.53 (gasoline only)<br>0.56 (worst-case loading) | 1.43 (gasoline only)<br>1.43 (worst-case loading) |
| Xylene | 0.33 (gasoline only)<br>0.35 (worst-case loading) | 0.90 (gasoline only)<br>0.90 (worst-case loading) |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Calculations for gasoline loading based on AP-42 Chapter 5.2 Transportation and Marketing of Petroleum Liquids, Table 5.2-2 "Volatile Organic Compound (VOC) Emission Factors for Gasoline Loading Operations at Marine Terminals", July 2008. Assumes a capture efficiency of 100% in accordance with the preamble to MACT Y (Federal Register: May 13, 1994) for vapor-tight vessels and use of a vacuum assist blower, and a control efficiency of 97% as required by 40 CFR 63.562(b)(2) of MACT Subpart Y. Note: Emissions presented above are gasoline-only barge loading and worst-case gasoline and distillate barge loading combined. Refer to Attachment I for detailed emission calculations.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

| **Citation** | **Citation Text** |
|---|---|
| 40 CFR 63.562(a) and | 63.562(a) The emissions limitations in paragraphs (b), (c), and (d) of this section apply during marine tank vessel loading operations. |

| | |
|---|---|
| (b)(1), (2), (5), and (6) | 63.562(b)(1)<br>63.562(b)(1)(i) Vapor collection system of the terminal.<br>The owner or operator of a new source with emissions less than 10 and 25 tons and an existing or new source with emissions of 10 or 25 tons shall equip each terminal with a vapor collection system that is designed to collect HAP vapors displaced from marine tank vessels during marine tank vessel loading operations and to prevent HAP vapors collected at one loading berth from passing through another loading berth to the atmosphere, except for those commodities exempted under §63.560(d).<br>63.562(b)(1)(ii) Ship-to-shore compatibility.<br>The owner or operator of a new source with emissions less than 10 and 25 tons and an existing or new source with emissions of 10 or 25 tons shall limit marine tank vessel loading operations to those vessels that are equipped with vapor collection equipment that is compatible with the terminal's vapor collection system, except for those commodities exempted under §63.560(d).<br>63.562(b)(1)(iii) Vapor tightness of marine vessels.<br>The owner or operator of a new source with emissions less than 10 and 25 tons and an existing or new source with emissions of 10 or 25 tons shall limit marine tank vessel loading operations to those vessels that are vapor tight and to those vessels that are connected to the vapor collection system, except for those commodities exempted under §63.560(d). |
| | 63.562(b)(2) MACT standards for existing sources with emissions of 10 or 25 tons.<br>The owner or operator of an existing source with emissions of 10 or 25 tons, except offshore loading terminals and the VMT source, shall reduce captured HAP emissions from marine tank vessel loading operations by 97 weight-percent, as determined using methods in §63.565(d) and (l). |
| | 63.562(b)(5) Prevention of carbon adsorber emissions during regeneration.<br>The owner or operator of a source subject to paragraph (b)(2), (3), or (4) shall prevent HAP emissions from escaping to the atmosphere from the regeneration of the carbon bed when using a carbon adsorber to control HAP emissions from marine tank vessel loading operations. |
| | 63.562(b)(6) Maintenance allowance for loading berths.<br>The owner or operator of a source subject to paragraph (b)(2), (3) or (4), may apply for approval to the Administrator for a maintenance allowance for loading berths based on a percent of annual throughput or annual marine tank vessel loading operation time for commodities not exempted in §63.560(d). The owner or operator shall maintain records for all maintenance performed on the air pollution control equipment. The Administrator will consider the following in approving the maintenance allowance:<br>63.562(b)(6)(i)<br>The owner or operator expects to be in violation of the emissions standards due to maintenance;<br>63.562(b)(6)(ii)<br>Due to conditions beyond the reasonable control of the owner or operator, compliance with the emissions standards during maintenance would result in unreasonable economic hardship;<br>63.562(b)(6)(iii)<br>The economic hardship cannot be justified by the resulting air quality benefit;<br>63.562(b)(6)(iv)<br>The owner or operator has given due consideration to curtailing marine vessel loading operations during maintenance;<br>63.562(b)(6)(v)<br>During the maintenance allowance, the owner or operator will endeavor to reduce emissions from other loading berths that are controlled as well as from the loading berth the owner or operator is seeking the maintenance allowance; and<br>63.562(b)(6)(vi)<br>During the maintenance allowance, the owner or operator will monitor and report emissions from the loading berth to which the maintenance allowance applies. |

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| 40 CFR 63.562(c)(2) through (6) | 63.562(c)(2)<br>63.562(c)(2)(i) Vapor collection system of the terminal.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels shall equip each terminal with a vapor collection system that is designed to collect VOC vapors displaced from marine tank vessels during loading and to prevent VOC vapors collected at one loading berth from passing through another loading berth to the atmosphere, except for those commodities exempted under §63.560(d).<br>63.562(c)(2)(ii) Ship-to-shore compatibility.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels shall limit marine tank vessel loading operations to those vessels that are equipped with vapor collection equipment that is compatible with the terminal's vapor collection system, except for those commodities exempted under §63.560(d).<br>63.562(c)(2)(iii) Vapor tightness of marine vessels.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels shall limit marine tank vessel loading operations to those vessels that are vapor-tight and to those vessels that are connected to the vapor collection system, except for those commodities exempted under §63.560(d). |
| | 63.562(c)(3) RACT standard for sources with throughput of 10 M or 200 M barrels, except the VMT source.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels, except the VMT source, shall reduce captured VOC emissions from marine tank vessel loading operations by 98 weight-percent when using a combustion device or reduce captured VOC emissions by 95 weight-percent when using a recovery device, as determined using methods in §63.565(d) and (l). |
| | 63.562(c)(4)<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels, except the VMT source, may meet the requirements of paragraph (c)(3) by reducing gasoline loading emissions to, at most, 1,000 ppmv outlet VOC concentration. |
| | 63.562(c)(5) Prevention of carbon adsorber emissions during regeneration.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels shall prevent HAP emissions from escaping to the atmosphere from the regeneration of the carbon bed when using a carbon adsorber to control HAP emissions from marine tank vessel loading operations. |
| | 63.562(c)(6) Maintenance allowance for loading berths.<br>The owner or operator of a source with throughput of 10 M barrels or 200 M barrels may apply for approval to the Administrator for a maintenance allowance for loading berths based on a percent of annual throughput or annual marine tank vessel loading operation time for commodities not exempted in §63.560(d). The owner or operator shall maintain records for all maintenance performed on the air pollution control equipment. The Administrator will consider the following in approving the maintenance allowance:<br>63.562(c)(6)(i)<br>The owner or operator expects to be in violation of the emissions standards due to maintenance;<br>63.562(c)(6)(ii)<br>Due to conditions beyond the reasonable control of the owner or operator, compliance with the emissions standards during maintenance would result in unreasonable economic hardship;<br>63.562(c)(6)(iii)<br>The economic hardship cannot be justified by the resulting air quality benefit;<br>63.562(c)(6)(iv)<br>The owner or operator has given due consideration to curtailing marine vessel loading operations during maintenance;<br>63.562(c)(6)(v)<br>During the maintenance allowance, the owner or operator will endeavor to reduce emissions from other loading berths that are controlled as well as from the loading berth the owner or operator is seeking the maintenance allowance; and<br>63.562(c)(6)(vi)<br>During the maintenance allowance, the owner or operator will monitor and report emissions from the loading berth to which the maintenance allowance applies. |

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| 40 CFR 63.562(e) | 63.562(e)<br>Operation and maintenance requirements for air pollution control equipment and monitoring equipment for affected sources. At all times, owners or operators of affected sources shall operate and maintain a source, including associated air pollution control equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether acceptable operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. |
| | 63.562(e)(1)<br>The Administrator will determine compliance with design, equipment, work practice, or operational emission standards by evaluating an owner or operator's conformance with operation and maintenance requirements.<br>63.562(e)(2)<br>The owner or operator of an affected source shall develop a written operation and maintenance plan that describes in detail a program of corrective action for varying (i.e., exceeding baseline parameters) air pollution control equipment and monitoring equipment, based on monitoring requirements in §63.564, used to comply with these emissions standards. The plan shall also identify all routine or otherwise predictable continuous monitoring system (thermocouples, pressure transducers, continuous emissions monitors (CEMS), etc.) variances.<br>63.562(e)(2)(i)<br>The plan shall specify procedures (preventive maintenance) to be followed to ensure that pollution control equipment and monitoring equipment functions properly and variances of the control equipment and monitoring equipment are minimal.<br>63.562(e)(2)(ii)<br>The plan shall identify all operating parameters to be monitored and recorded for the air pollution control device as indicators of proper operation and shall establish the frequency at which the parameters will be monitored (see §63.564).<br>63.562(e)(2)(iii)<br>Owners or operators of affected sources shall incorporate a standardized inspection schedule for each component of the control device used to comply with the emissions standards in §63.562(b), (c), and (d). To satisfy the requirements of this paragraph, the owner or operator may use the inspection schedule recommended by the vendor of the control system or any other technical publication regarding the operation of the control system.<br>63.562(e)(2)(iv)<br>Owners or operators shall develop and implement a continuous monitoring system (CMS) quality control program. The owner or operator shall develop and submit to the Administrator for approval upon request a site-specific performance evaluation test plan for the CMS performance evaluation required in §63.8(e) of subpart A of this part. Each quality control program shall include, at a minimum, a written protocol that describes procedures for initial and any subsequent calibration of the CMS; determination and adjustment of the calibration drift of the CMS; preventive maintenance of the CMS, including spare parts inventory; data recording, calculations, and reporting; and accuracy audit procedures, including sampling and analysis methods. The owner or operation shall maintain records of the procedures that are part of the quality control program developed and implemented for CMS.<br>63.562(e)(3)<br>Based on the results of the determination made under paragraph (e)(2), the Administrator may require that an owner or operator of an affected source make changes to the operation and maintenance plan for that source. Revisions may be required if the plan:<br>63.562(e)(3)(i)<br>Does not address a variance of the air pollution control equipment or monitoring equipment that has occurred that increases emissions;<br>63.562(e)(3)(ii)<br>Fails to provide for operation during a variance of the air pollution control equipment or the monitoring equipment in a manner consistent with safety and good air pollution control practices; or<br>63.562(e)(3)(iii)<br>Does not provide adequate procedures for correcting a variance of the air pollution control |

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| | equipment or monitoring equipment as soon as reasonable.<br>63.562(e)(4)<br>If the operation and maintenance plan fails to address or inadequately addresses a variance event at the time the plan was initially developed, the owner or operator shall revise the operation and maintenance plan within 45 working days after such an event occurs. The revised plan shall include procedures for operating and maintaining the air pollution control equipment or monitoring equipment during similar variance events and a program for corrective action for such events.<br>63.562(e)(5)<br>The operation and maintenance plan shall be developed by the source's compliance date. The owner or operator shall keep the written operation and maintenance plan on record to be made available for inspection, upon request, by the Administrator for the life of the source. In addition, if the operation and maintenance plan is revised, the owner or operator shall keep previous (i.e., superseded) versions of the plan on record to be made available for inspection upon request by the Administrator for a period of 5 years after each revision to the plan.<br>63.562(e)(6)<br>To satisfy the requirements of the operation and maintenance plan, the owner or operator may use the source's standard operating procedures (SOP) manual, an Occupational Safety and Health Administration (OSHA) plan, or other existing plans provided the alternative plans meet the requirements of this section and are made available for inspection when requested by the Administrator.<br>63.562(e)(7)<br>In response to an action to enforce the standards set forth in this subpart, you may assert an affirmative defense to a claim for civil penalties for exceedances of such standards that are caused by a malfunction, as defined in § 63.2. Appropriate penalties may be assessed, however, if the respondent fails to meet its burden of proving all the requirements in the affirmative defense. The affirmative defense shall not be available for claims for injunctive relief.<br>63.562(e)(7)(i)<br>To establish the affirmative defense in any action to enforce such a limit, the owners or operators of a facility must timely meet the notification requirements of paragraph (e)(7)(ii) of this section, and must prove by a preponderance of evidence that:<br>63.562(e)(7)(i)(A)<br>The excess emissions were caused by a sudden, infrequent, and unavoidable failure of air pollution control and monitoring equipment, or a process to operate in a normal and usual manner; and could not have been prevented through careful planning, proper design or better operation and maintenance practices; and did not stem from any activity or event that could have been foreseen and avoided, or planned for; and were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;<br>63.562(e)(7)(i)(B)<br>Repairs were made as expeditiously as possible when the applicable emission limitations were being exceeded. Off-shift and overtime labor were used, to the extent practicable to make these repairs;<br>63.562(e)(7)(i)(C)<br>The frequency, amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions;<br>63.562(e)(7)(i)(D)<br>If the excess emissions resulted from a bypass of control equipment or a process, then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;<br>63.562(e)(7)(i)(E)<br>All possible steps were taken to minimize the impact of the excess emissions on ambient air quality, the environment, and human health;<br>63.562(e)(7)(i)(F)<br>All emissions monitoring and control systems were kept in operation if at all possible, consistent with safety and good air pollution control practices;<br>63.562(e)(7)(i)(G)<br>All of the actions in response to the excess emissions were documented by properly signed, contemporaneous operating logs;<br>63.562(e)(7)(i)(H)<br>At all times, the affected facility was operated in a manner consistent with good practices for |

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| | minimizing emissions; and<br>63.562(e)(7)(i)(I)<br>The owner or operator has prepared a written root cause analysis, the purpose of which is to determine, correct, and eliminate the primary causes of the malfunction and the excess emissions resulting from the malfunction event at issue. The analysis shall also specify, using the best monitoring methods and engineering judgment, the amount of excess emissions that were the result of the malfunction.<br>63.562(e)(7)(ii) Notification.<br>The owner or operator of the facility experiencing an exceedance of its emission limit(s) during a malfunction shall notify the Administrator by telephone or facsimile (FAX) transmission as soon as possible, but no later than 2 business days after the initial occurrence of the malfunction, if it wishes to avail itself of an affirmative defense to civil penalties for that malfunction. The owner or operator seeking to assert an affirmative defense shall also submit a written report to the Administrator within 45 days of the initial occurrence of the exceedance of the standard in this subpart to demonstrate, with all necessary supporting documentation, that it has met the requirements set forth in paragraph (e)(7)(i) of this section. The owner or operator may seek an extension of this deadline for up to 30 additional days by submitting a written request to the Administrator before the expiration of the 45 day period. Until a request for an extension has been approved by the Administrator, the owner or operator is subject to the requirement to submit such report within 45 days of the initial occurrence of the exceedance. |
| 40 CFR 63.563(a) | 63.563(a)<br>The following procedures shall be used to determine compliance with the emissions limits under §63.562(b)(1), (c)(2), and (d)(1):<br>**63.563(a)(1) Vent stream by-pass requirements for the terminal's vapor collection system.**<br>63.563(a)(1)(i)<br>In accordance with §63.562(b)(1)(i), (c)(2)(i), and (d)(1)(i), each valve in the terminal's vapor collection system that would route displaced vapors to the atmosphere, either directly or indirectly, shall be secured closed during marine tank vessel loading operations either by using a car-seal or a lock-and-key type configuration, or the by-pass line from the valve shall be equipped with a flow indicator, except for those valves used for pressure/vacuum relief, analyzers, instrumentation devices, sampling, and venting for maintenance. Marine tank vessel loading operations shall not be performed with open by-pass lines.<br>63.563(a)(1)(ii)<br>Repairs shall be made to valves, car-seals, or closure mechanisms no later than 15 days after a change in the position of the valve or a break in the car-seal or closure mechanism is detected or no later than prior to the next marine tank vessel loading operation, whichever is later.<br>**63.563(a)(2) Ship-to-shore compatibility of vapor collection systems.**<br>Marine tank vessel loading operations must be performed only if the marine tank vessel's vapor collection equipment is compatible to the terminal's vapor collection system; marine tank vessel loading operations must be performed only when the marine tank vessel's vapor collection equipment is connected to the terminal's vapor collection system, as required in §63.562(b)(1)(ii), (c)(2)(ii), and (d)(1)(ii).<br>63.563(a)(3) Pressure/vacuum settings for the marine tank vessel's vapor collection equipment.<br>During the initial performance test required in paragraph (b)(1) of this section, the owner or operator of an affected source shall demonstrate compliance with operating pressure requirements of 33 CFR 154.814 using the procedures in §63.565(b). |
| | **63.563(a)(4) Vapor-tightness requirements of the marine vessel.**<br>The owner or operator of an affected source shall use the procedures in paragraph (a)(4)(i), (ii), (iii), or (iv) of this section to ensure that marine tank vessels are vapor tight, as required in §63.562(b)(1)(iii), (c)(2)(iii), and (d)(1)(iii).<br>63.563(a)(4)(i) Pressure test documentation for determining vapor tightness of the marine vessel.<br>The owner or operator of a marine tank vessel, who loads commodities containing HAP not determined to be exempt under §63.560(d) at an affected source, shall provide a copy of the vapor-tightness pressure test documentation described in §63.567(i) for each marine tank vessel prior to loading. The date of the test listed in the documentation must be within the preceding 12 months, and the test must be conducted in accordance with the procedures in §63.565(c)(1). Following the date on which the initial performance test is completed, the affected source must check vapor-tightness pressure test documentation for marine tank vessels loaded at positive |

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| | pressure.<br>**63.563(a)(4)(ii) Leak test documentation for determining vapor tightness of the marine vessel.**<br>If no documentation of the vapor tightness pressure test as described in paragraph (a)(4)(i) of this section is available, the owner or operator of a marine tank vessel, who loads commodities containing HAP not determined to be exempt under §63.560(d) at an affected source, shall provide the leak test documentation described in §63.567(i) for each marine tank vessel prior to loading. The date of the test listed in the documentation must be within the preceding 12 months, and the test must be conducted in accordance with the procedures in §63.565(c)(2). If the marine tank vessel has failed its most recent vapor-tightness leak test at that terminal, the owner or operator of the non-vapor-tight marine tank vessel shall provide documentation that the leaks detected during the previous vapor-tightness test have been repaired and documented with a successful vapor-tightness leak test described in §63.565(c)(2) conducted during loading. If the owner or operator of the marine tank vessel can document that repair is technically infeasible without cleaning and gas freeing or dry-docking the vessel, the owner or operator of the affected source may load the marine tank vessel. Following the date on which the initial performance test is completed, an affected source must check the vapor-tightness leak test documentation for marine tank vessels loaded at positive pressure.<br>**63.563(a)(4)(iii) Leak test performed during loading using Method 21 for determining vapor tightness of the marine vessel.**<br>If no documentation of vapor tightness as described in paragraphs (a)(4)(i) or (ii) of this section is available, the owner or operator of a marine tank vessel, who loads commodities containing HAP not determined to be exempt under §63.560(d) at an affected source, shall perform a leak test of the marine tank vessel during marine tank vessel loading operation using the procedures described in §63.565(c)(2).<br>63.563(a)(4)(iii)(A)<br>If no leak is detected, the owner or operator of a marine tank vessel shall complete the documentation described in §63.567(i) prior to departure of the vessel.<br>63.563(a)(4)(iii)(B)<br>If a leak is detected, the owner or operator of the marine tank vessel shall document the vapor-tightness failure for the marine tank vessel prior to departure of the vessel. The leaking component shall be repaired prior to the next marine tank vessel loading operation at a controlled terminal unless the repair is technically infeasible without cleaning and gas freeing or dry-docking the vessel. If the owner or operator of the vessel provides documentation that repair of such equipment is technically infeasible without cleaning and gas freeing or dry-docking the vessel, the equipment responsible for the leak will be excluded from future Method 21 tests until repairs are effected. A copy of this documentation shall be maintained by the owner or operator of the affected source. Repair of the equipment responsible for the leak shall occur the next time the vessel is cleaned and gas freed or dry-docked. For repairs that are technically feasible without dry-docking the vessel, the owner or operator of the affected source shall not load the vessel again unless the marine tank vessel owner or operator can document that the equipment responsible for the leak has been repaired.<br>63.563(a)(4)(iv) Negative pressure loading.<br>The owner or operator of an affected source shall ensure that a marine tank vessel is loaded with the product tank below atmospheric pressure (i.e., at negative gauge pressure). The pressure shall be measured between the facility's vapor connection and its manual isolation valve, and the measured pressure must be below atmospheric pressure. Following the date on which the initial performance test is completed, marine tank vessel loading operations for nonvapor-tight vessels must be performed below atmospheric pressure (i.e., at negative gauge pressure) in the product tank. |
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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

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| 40 CFR 63.563(b)(3) | 63.563(b)(3) Operation and maintenance inspections.<br>If the 3-hour or 3-cycle block average operating parameters in paragraphs (b)(4) through (9) of this section, outside the acceptable operating ranges, are measured and recorded, i.e., variances of the pollution control device or monitoring equipment, the owner or operator of the affected source shall perform an unscheduled inspection of the control device and monitoring equipment and review of the parameter monitoring data. The owner or operator of the affected source shall perform an inspection and review when total parameter variance time for the control device is greater than 10 percent of the operating time for marine tank vessel loading operations on a 30-day, rolling-average basis. The inspection and review shall be conducted within 24 hours after passing the allowable variance time of 10 percent. The inspection checklist from the requirements of §63.562(e)(2)(iii) and the monitoring data from requirements in §§63.562(e)(2)(ii) and 63.564 should be used to identify any maintenance problems that may be associated with the variance. The unscheduled inspection should encompass all components of the control device and monitoring equipment that can be inspected while in operation. If any maintenance problem is identified during the inspection, the owner or operator of the affected source must take corrective action (e.g., adjustments to operating controls, etc.) as soon as practicable. If no immediate maintenance problems are identified from the inspection performed while the equipment is operating, a complete inspection in accordance with §63.562(e)(2) must be conducted prior to the next marine tank vessel loading operation and corrective action (e.g., replacement of defective parts) must be taken as soon as practicable for any maintenance problem identified during the complete inspection. |
| 40 CFR 63.563(b)(6) | 63.563(b)(6) Carbon adsorber.<br>The owner or operator of affected sources complying with paragraph (b)(6)(ii)(B) or (C) of this section shall conduct a performance test once each year. |
| | 63.563(b)(6)(i) Compliance determination for carbon bed regeneration.<br>Desorbed hydrocarbons from regeneration of the off-line carbon bed shall be vented to the on-line carbon bed. |
| | 63.563(b)(6)(ii) Baseline parameters for required percent recovery efficiency.<br>The owner or operator shall comply with paragraph (b)(6)(ii)(A), (B), or (C) of this section.<br>63.563(b)(6)(ii)(A) Outlet VOC concentration limit for required percent recovery efficiency.<br>The owner or operator shall establish as an operating parameter the baseline VOC concentration using the procedures described in §63.565(g). The facility shall be operated with a block average outlet VOC concentration as determined in §63.564(g)(1) no more than 20 percent above the baseline VOC concentration.<br>63.563(b)(6)(ii)(B) Carbon adsorbers with vacuum regeneration.<br>The owner or operator shall establish as operating parameters the baseline regeneration time for the vacuum stage of carbon bed regeneration using the procedures described in §63.565(h) and shall establish the baseline vacuum pressure (negative gauge pressure) using the procedures described in §63.565(i). The facility shall be operated with block average regeneration time of the vacuum stage of carbon bed regeneration as determined in §63.564(g)(2) no more than 20 percent below the baseline regeneration time, and the facility shall be operated with the block average vacuum pressure (negative gauge pressure) as determined in §63.564(g)(2) no more than 20 percent above the baseline vacuum pressure. |
| | 63.563(b)(6)(iii) Outlet VOC concentration of 1,000 ppmv for gasoline loading.<br>Following the date on which the initial performance test is completed, the facility shall |

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| | operate with a block average outlet VOC concentration as determined in §63.564(g)(1) of no more than 1,200 ppmv VOC. |
| 40 CFR 63.563(b)(9) | 63.563(b)(9) Alternative control devices.<br>For sources complying with §63.562(b)(2), (3), and (4), (c)(3) and (4), and (d)(2) with the use of a control technology other than the devices discussed in paragraphs (b)(4) through (8) of this section, the owner or operator of an affected source shall provide to the Administrator information describing the design and operation of the air pollution control system, including recommendations for the operating parameter(s) to be monitored to indicate proper operation and maintenance of the air pollution control system. Based on this information, the Administrator shall determine the operating parameter(s) to be established during the performance test. During the initial performance test required in paragraph (b)(1) of this section, the owner or operator shall determine the efficiency of the air pollution control system using the test methods in §63.565(d). The device shall achieve at least the percent destruction efficiency or recovery efficiency required under §63.562(b)(2), (3), and (4), (c)(3) and (4), and (d)(2). The owner or operator shall establish the operating parameter(s) approved by the Administrator. Following the date on which the initial performance test is complete, the facility shall operate either above or below a maximum or minimum operating parameter, as appropriate. |
| 40 CFR 63.563(b)(10) | 63.563(b)(10) Emission estimation.<br>The owner or operator of a source subject to §63.562(b)(2), (3), and (4) shall use the emission estimation procedures in §63.565(l) to calculate HAP emissions. |
| 40 CFR 63.563(c) | 63.563(c) Leak detection and repair for vapor collection systems and control devices.<br>The following procedures are required for all sources subject to §63.562(b), (c), or (d).<br>63.563(c)(1) Annual leak detection and repair for vapor collection systems and control devices.<br>The owner or operator of an affected source shall inspect and monitor all ductwork and piping and connections to vapor collection systems and control devices once each calendar year using Method 21.<br>63.563(c)(2) Ongoing leak detection and repair for vapor collection systems and control devices.<br>If evidence of a potential leak is found by visual, audible, olfactory, or any other detection method, all ductwork and piping and connections to vapor collection systems and control devices shall be inspected to the extent necessary to positively identify the potential leak and any potential leaks shall be monitored within 5 days by Method 21. Each detection of a leak shall be recorded, and the leak shall be tagged until repaired.<br>63.563(c)(3)<br>When a leak is detected, a first effort to repair the vapor collection system and control device shall be made within 15 days or prior to the next marine tank vessel loading operation, whichever is later. |
| 40 CFR 63.564(a) | 63.564(a)<br>63.564(a)(1)<br>The owner or operator of an affected source shall comply with the monitoring requirements in §63.8 of subpart A of this part in accordance with the provisions for applicability of subpart A to this subpart in Table 1 of §63.560 and the monitoring requirements in this section.<br>63.564(a)(2)<br>Each owner or operator of an affected source shall monitor the parameters specified in this section. All monitoring equipment shall be installed such that representative measurements of emissions or process parameters from the source are obtained. For monitoring equipment purchased from a vendor, verification of the operational status of the monitoring equipment shall include completion of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.<br>63.564(a)(3)<br>Except for system breakdowns, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high-level calibration drift adjustments, all |

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| | continuous parametric monitoring systems (CPMS) and CEMS shall be in continuous operation while marine tank vessel loading operations are occuring and shall meet minimum frequency of operation requirements. Sources monitoring by use of CEMS and CPMS shall complete a minimum of one cycle of operation (sampling, analyzing, and/or data recording) for each successive 15-minute period.<br>63.564(a)(4)<br>The owner or operator of a CMS installed in accordance with these emissions standards shall comply with the performance specifications either in performance specification (PS) 8 in 40 CFR part 60, appendix B for CEMS or in §63.7(c)(6) of subpart A of this part for CPMS.<br>63.564(a)(5)<br>A CEMS is out of control when the measured values (i.e., daily calibrations, multipoint calibrations, and performance audits) exceed the limits specified in either PS 8 or in §63.8(c)(7) of subpart A of this part. The owner or operator of a CEMS that is out of control shall submit all information concerning out of control periods, including start and end dates and hours and descriptions of corrective actions taken, in the excess emissions and continuous monitoring system performance report required in §63.567(e). |
| 40 CFR 63.564(b) | 63.564(b) Vapor collection system of terminal.<br>Owners or operators of a source complying with §63.563(a)(1) that uses a vapor collection system that contains valves that could divert a vent stream from a control device used to comply with the provisions of this subpart shall comply with paragraph (b)(1), (2), or (3) of this section.<br>63.564(b)(1)<br>Measure and record the vent stream flowrate of each by-pass line once every 15 minutes. The owner or operator shall install, calibrate, maintain, and operate a flow indicator and data recorder. The flow indicator shall be installed immediately downstream of any valve (i.e., entrance to by-pass line) that could divert the vent stream from the control device to the atmosphere.<br>63.564(b)(2)<br>Measure the vent stream flowrate of each by-pass line once every 15 minutes. The owner or operator shall install, calibrate, maintain, and operate a flow indicator with either an audio or visual alarm. The flow indicator and alarm shall be installed immediately downstream of any valve (i.e., entrance to by-pass line) that could divert the vent stream from the control device to the atmosphere. The alarm shall be checked every 6 months to demonstrate that it is functioning properly.<br>63.564(b)(3)<br>Visually inspect the seal or closure mechanism once during each marine tank vessel loading operation and at least once every month to ensure that the valve is maintained in the closed position and that the vent stream is not diverted through the by-pass line; record all times when the car seals have been broken and the valve position has been changed. Each by-pass line valve shall be secured in the closed position with a car-seal or a lock-and-key type configuration. |
| 40 CFR 63.564(c) | 63.564(c) Pressure/vacuum settings for the marine tank vessel's vapor collection equipment.<br>Owners or operators of a source complying with §63.563(a)(3) shall measure continuously the operating pressure of the marine tank vessel during loading. |
| 40CFR 63.564(d) and 45CSR34 | 63.564(d) Loading at negative pressure.<br>Owners or operators of a source complying with §63.563(a)(4)(iv) that load vessels at less than atmospheric pressure (i.e., negative gauge pressure) shall measure and record the loading pressure. The owner or operator shall install, calibrate, maintain, and operate a recording pressure measurement device (magnehelic gauge or equivalent device) and an audible and visible alarm system that is activated when the pressure vacuum specified in §63.563(a)(4)(iv) is not attained. The owner or operator shall place the alarm system so that it can be seen and heard where cargo transfer is controlled. The owner or operator shall verify the accuracy of the pressure device once each calendar year with a reference pressure monitor (traceable to National Institute of Standards and Technology (NIST) standards or an independent pressure measurement device dedicated for this purpose). |

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| 40 CFR 63.564(g) | 63.564(g) Carbon adsorber.<br>For sources complying with §63.563(b)(6), use of a carbon adsorber, the owner or operator shall comply with paragraph (g)(1), (2), or (3) of this section.<br>63.564(g)(1) Outlet VOC concentration.<br>Monitor the VOC concentrations at the exhaust point of each carbon adsorber unit and record the output from the system. For sources monitoring the outlet VOC concentration established during the performance test, a data acquisition system shall record a concentration every 15 minutes and shall compute and record an average concentration each cycle (same time period or cycle as the performance test) and a 3-cycle block average concentration every third cycle. For sources monitoring the 1,000 ppmv VOC concentration for gasoline loading, a data acquisition system shall record a concentration every 15 minutes and shall compute and record an average concentration each hour and a 3-hour block average concentration every third hour. The owner or operator will install, calibrate, operate, and maintain a CEMS consistent with the requirements of PS 8 to measure the VOC concentration. The daily calibration requirements are required only on days when marine tank vessel loading operations occur.<br>63.564(g)(2) Carbon adsorbers with vacuum regeneration.<br>Monitor and record the regeneration time for carbon bed regeneration and monitor and record continuously the vacuum pressure of the carbon bed regeneration cycle. The owner or operator will record the time when the carbon bed regeneration cycle begins and when the cycle ends for a single carbon bed and will calculate a 3-cycle block average every third cycle. The owner or operator shall install, calibrate, maintain, and operate a recording pressure measurement device (magnehelic gauge or equivalent device). A data acquisition system shall record and compute a 3-cycle (carbon bed regeneration cycle) block average vacuum pressure every third cycle. The owner or operator shall verify the accuracy of the pressure device once each calendar year with a reference pressure monitor (traceable to National Institute of Standards and Technology (NIST) standards or an independent pressure measurement device dedicated for this purpose). During accuracy checking, the probe of the reference device shall be at the same location as that of the pressure monitor being tested. |
| 40 CFR 63.564(j) | 63.564(j) Alternate monitoring procedures.<br>Alternate procedures to those described in this section may be used upon application to, and approval by, the Administrator. The owner or operator shall comply with the procedures for use of an alternative monitoring method in §63.8(f). |
| 40 CFR 63.565(a) | 63.565(a) Performance testing.<br>The owner or operator of an affected source in §63.562 shall comply with the performance testing requirements in §63.7 of subpart A of this part in accordance with the provisions for applicability of subpart A to this subpart in Table 1 of §63.560 and the performance testing requirements in this section. |
| 40 CFR 63.565(b) | 63.565(b) Pressure/vacuum settings of marine tank vessel's vapor collection equipment.<br>For the purpose of determining compliance with §63.563(a)(3), the following procedures shall be used:<br>63.565(b)(1)<br>Calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge, or equivalent instrument) capable of measuring up to the maximum relief set pressure of the pressure-vacuum vents;<br>63.565(b)(2)<br>Connect the pressure measurement device to a pressure tap in the terminal's vapor collection system, located as close as possible to the connection with the marine tank vessel; and<br>63.565(b)(3)<br>During the performance test required in §63.563(b)(1), record the pressure every 5 minutes while a marine tank vessel is being loaded and record the highest instantaneous pressure and vacuum that occurs during each loading cycle. |
| 40 CFR 63.565(c) | 3.565(c) Vapor-tightness test procedures for the marine tank vessel.<br>When testing a vessel for vapor tightness to comply with the marine vessel vapor-tightness requirements of §63.563(a)(4)(i), the owner or operator of a source shall use the methods in either paragraph (c)(1) or (2) in this section. |

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| | 63.565(c)(1) Pressure test for the marine tank vessel.<br>63.565(c)(1)(i)<br>Each product tank shall be pressurized with dry air or inert gas to no more than the pressure of the lowest pressure relief valve setting.<br>63.565(c)(1)(ii)<br>Once the pressure is obtained, the dry air or inert gas source shall be shut off.<br>63.565(c)(1)(iii)<br>At the end of one-half hour, the pressure in the product tank and piping shall be measured. The change in pressure shall be calculated using the following formula:<br>P=Pi−Pf<br>Where:<br>P=change in pressure, inches of water.<br>Pi=pressure in tank when air/gas source is shut off, inches of water.<br>Pf=pressure in tank at the end of one-half hour after air/gas source is shut off, inches of water.<br>63.565(c)(1)(iv)<br>The change in pressure, P, shall be compared to the pressure drop calculated using the following formula:<br>PM=0.861 PiaL/V<br>Where:<br>PM=maximum allowable pressure change, inches of water.<br>Pia=pressure in tank when air/gas source is shut off, psia.<br>L=maximum permitted loading rate of vessel, barrels per hour.<br>V=total volume of product tank, barrels.<br>63.565(c)(1)(v)<br>If P≤PM, the vessel is vapor tight.<br>63.565(c)(1)(vi)<br>If P<PM, the vessel is not vapor tight and the source of the leak must be identified and repaired prior to retesting.<br>63.565(c)(2) Leak test for the marine tank vessel.<br>Each owner or operator of a source complying with §§63.563(a)(4)(ii) or (iii) shall use Method 21 as the vapor-tightness leak test for marine tank vessels. The test shall be conducted during the final 20 percent of loading of each product tank of the marine vessel, and it shall be applied to any potential sources of vapor leaks on the vessel. |
| 40 CFR 63.565(d)(1)-(3) and (5)-(10) | 63.565(d)(1)<br>All testing equipment shall be prepared and installed as specified in the appropriate test methods.<br>63.565(d)(2)<br>All testing shall be performed during the last 20 percent of loading of a tank or compartment.<br>63.565(d)(3)<br>All emission testing intervals shall consist of each 5 minute period during the performance test. For each interval, the following shall be performed:<br>63.565(d)(3)(i) Readings.<br>The reading from each measurement instrument shall be recorded.<br>63.565(d)(3)(ii) Sampling Sites.<br>Method 1 or 1A of appendix A of part 60 of this chapter, as appropriate, shall be used for selection of sampling sites. Sampling sites shall be located at the inlet and outlet of the combustion device or recovery device except for owners or operators complying with the 1,000 ppmv VOC emissions limit for gasoline vapors under §63.563(b)(6) or (7), where the sampling site shall be located at the outlet of the recovery device.<br>63.565(d)(3)(iii) Volume exhausted.<br>The volume exhausted shall be determined using Method 2, 2A, 2C, or 2D of appendix A of part 60 of this chapter, as appropriate. |
| | 63.565(d)(5) Recovery devices.<br>The average VOC concentration in the vent upstream and downstream of the control device shall be determined using Method 25A or 25B of appendix A-7 to part 60 of this chapter for |

recovery devices. The average VOC concentration shall correspond to the volume measurement by taking into account the sampling system response time.

63.565(d)(6)

The VOC mass at the inlet and outlet of the combustion or recovery device during each testing interval shall be calculated as follows:

Mj=FKVsCVOC

Where:

Mj=mass of VOC at the inlet and outlet of the combustion or recovery device during testing interval j, kilograms (kg).

F=10−6=conversion factor, (cubic meters VOC/cubic meters air)(1/ppmv) (m3 VOC/m3 air)(1/ppmv).

K=density, kilograms per cubic meter (kg/m3 VOC), standard conditions, 20 °C and 760 mm Hg.

Vs=volume of air-vapor mixture at the inlet and outlet of the combustion or recovery device, cubic meters (m3) at standard conditions, 20 °C and 760 mm Hg.

CVOC=VOC concentration (as measured) at the inlet and outlet of the combustion or recovery device, ppmv, dry basis.

s=standard conditions, 20 °C and 760 mm Hg.

3.565(d)(7)

The VOC mass emission rates at the inlet and outlet of the recovery or combustion device shall be calculated as follows:

Where:

$$E_i = \frac{\sum_{j=1}^{n} M_{ij}}{T}$$

$$E_o = \frac{\sum_{j=1}^{n} M_{oj}}{T}$$

$E_i$, $E_o$=mass flow rate of VOC at the inlet (i) and outlet (o) of the recovery or combustion device, kilogram per hour (kg/hr).

$M_{ij}$, $M_{oj}$=mass of VOC at the inlet (i) or outlet (o) during testing interval j, kg.

T=Total time of all testing intervals, hour.

n=number of testing intervals.

63.565(d)(8)

Where Method 25, 25A, or 25B is used to measure the percent reduction in VOC, the percent reduction across the combustion or recovery device shall be calculated as follows:

$$R = \frac{E_i - E_o}{E_i} (100\%)$$

Where:

R = control efficiency of control device, percent.

$E_i$ = mass flow rate of VOC at the inlet to the combustion or recovery device as calculated under paragraph (c)(7) of this section, kg/hr.

$E_o$ = mass flow rate of VOC at the outlet of the combustion or recovery device, as calculated under paragraph (c)(7) of this section, kg/hr.

63.565(d)(9)

Repeat the procedures in paragraph (d)(1) through (d)(8) of this section 3 times. The arithmetic average percent efficiency of the three runs shall determine the overall efficiency of the control device.

63.565(d)(10)

Use of methods other than Method 25, 25A, or 25B shall be validated pursuant to Method 301 of appendix A to part 63 of this chapter.

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| 40 CFR 63.565(g) | 63.565(g) Baseline outlet VOC concentration.<br>The procedures in this paragraph shall be used to determine the outlet VOC concentration required in § 63.563(b)(4), (6), (7), and (8) for combustion devices except flare, carbon adsorbers, condenser/refrigeration units, and absorbers, respectively, and to monitor the VOC concentration as required in § 63.564(e), (g), (h), and (i). The owner or operator shall use the procedures outlined in Method 25A or 25B. For the baseline VOC concentration, the arithmetic average of the outlet VOC concentration from three test runs from paragraph (d) of this section shall be calculated for the control device. The VOC concentration shall be measured at least every 15 minutes. Compliance testing of VOC CEMS shall be performed using PS 8. |
| 40 CFR 63.565(h) | 63.565(h) Baseline regeneration time for carbon bed regeneration.<br>The procedures in this paragraph shall be used to demonstrate the baseline regeneration time for the vacuum stage of carbon bed regeneration required in §63.563(b)(6) for a carbon adsorber and to monitor the regeneration time for the vacuum regeneration as required in §63.564(g). The owner or operator shall comply with paragraph (h)(1) or (2).<br>63.565(h)(1) Baseline regeneration time from performance testing.<br>The owner or operator shall establish the baseline regeneration time as the length of time for the vacuum stage of carbon bed regeneration averaged over three test runs from paragraph (d) of this section.<br>63.565(h)(2) Baseline regeneration time from manufacturer recommendation.<br>The owner or operator shall establish the baseline regeneration time as the manufacturer recommended minimum regeneration time for the vacuum stage of carbon bed regeneration. |
| 40 CFR 63.565(i) | 63.565(i) Baseline vacuum pressure for carbon bed regeneration.<br>The procedures in this paragraph shall be used to demonstrate the baseline vacuum pressure for the vacuum stage of carbon bed regeneration required in §63.563(b)(6) for a carbon adsorber and to monitor the vacuum pressure as required in §63.564(g). The owner or operator shall establish the baseline vacuum pressure as the manufacturer recommended minimum vacuum for carbon bed regeneration. |
| 40 CFR 63.565(j) | 63.565(j) Baseline total stream flow.<br>The procedures in this paragraph shall be used to demonstrate the baseline total stream flow for steam regeneration required in §63.563(b)(6) for a carbon adsorber and to monitor the total stream flow as required in §63.564(g). The owner or operator shall establish the baseline stream flow as the manufacturer recommended minimum total stream flow for carbon bed regeneration. |
| 40 CFR 63.565(l) | 63.565(l) Emission estimation procedures.<br>For sources with emissions less than 10 or 25 tons and sources with emissions of 10 or 25 tons, the owner or operator shall calculate an annual estimate of HAP emissions, excluding commodities exempted by §63.560(d), from marine tank vessel loading operations. Emission estimates and emission factors shall be based on test data, or if test data is not available, shall be based on measurement or estimating techniques generally accepted in industry practice for operating conditions at the source. |
| 40CFR 63.565(m)(1) | 63.565(m) Alternate test procedures.<br>63.565(m)(1)<br>Alternate test procedures to those described in this section may be used upon application to, and approval by, the Administrator. |
| | 63.565(m)(2)<br>If the owner or operator intends to demonstrate compliance by using an alternative to any test method specified, the owner or operator shall refrain from conducting the performance test until the Administrator approves the use of the alternative method when the Administrator approves the site-specific test plan (if review of the site-specific test plan is requested) or until after the alternative method is approved (see §63.7(f) of subpart A of this part). If the Administrator does not approve the site-specific test plan (if review is requested) or the use of the alternative method within 30 days before the test is scheduled to begin, the |

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| | performance test dates specified in §63.563(b)(1) shall be extended such that the owner or operator shall conduct the performance test within 60 calendar days after the Administrator approves the site-specific test plan or after use of the alternative method is approved. Notwithstanding the requirements in the preceding two sentences, the owner or operator may proceed to conduct the performance test as required in this section (without the Administrator's prior approval of the site-specific test plan) if he/she subsequently chooses to use the specified testing and monitoring methods instead of an alternative. |
| 40 CFR 63.567(a) | 63.567(a)<br>The owner or operator of an affected source shall fulfill all reporting and recordkeeping requirements in §§63.9 and 63.10 of subpart A of this part in accordance with the provisions for applicability of subpart A to this subpart in Table 1 of §63.560 and fulfill all reporting and recordkeeping requirements in this section. These reports will be made to the Administrator at the appropriate address identified in §63.13 of subpart A of this part.<br>63.567(a)(1)<br>Reports required by subpart A and this section may be sent by U.S. mail, facsimile (fax), or by another courier.<br>63.567(a)(1)(i)<br>Submittals sent by U.S. mail shall be postmarked on or before the specified date.<br>63.567(a)(1)(ii)<br>Submittals sent by other methods shall be received by the Administrator on or before the specified date.<br>63.567(a)(2)<br>If acceptable to both the Administrator and the owner or operator of a source, reports may be submitted on electronic media. |
| 40 CFR 63.567(e) | 63.567(e)(1) Schedule for summary report and excess emissions and monitoring system performance reports.<br>Excess emissions and parameter monitoring exceedances are defined in §63.563(b). The owner or operator of a source subject to these emissions standards that is required to install a CMS shall submit an excess emissions and continuous monitoring system performance report and/or a summary report to the Administrator once each year, except, when the source experiences excess emissions, the source shall comply with a semi-annual reporting format until a request to reduce reporting frequency under paragraph (e)(2) of this section is approved.<br>63.567(e)(2) Request to reduce frequency of excess emissions and continuous monitoring system performance reports.<br>An owner or operator who is required to submit excess emissions and continuous monitoring system performance and summary reports on a semi-annual basis may reduce the frequency of reporting to annual if the following conditions are met:<br>63.567(e)(2)(i)<br>For 1 full year the sources's excess emissions and continuous monitoring system performance reports continually demonstrate that the source is in compliance; and<br>63.567(e)(2)(ii)<br>The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in this subpart and subpart A of this part.<br>63.567(e)(3)<br>The frequency of reporting of excess emissions and continuous monitoring system performance and summary reports required may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the 5-year recordkeeping prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation maintenance requirements. Such information may be used by the Administrator to make a judgement about the source's potential for noncompliance in the future. If the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, |

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| | approval is automatically granted.<br>63.567(e)(4) Content and submittal dates for excess emissions and monitoring system performance reports.<br>All excess emissions and monitoring system performance reports and all summary reports, if required per paragraph (e)(5) and (6) of this section, shall be delivered or postmarked within 30 days following the end of each calendar year, or within 30 days following the end of each six month period, if appropriate. Written reports of excess emissions or exceedances of process or control system parameters shall include all information required in §63.10(c)(5) through (13) of subpart A of this part as applicable in Table 1 of §63.560 and information from any calibration tests in which the monitoring equipment is not in compliance with PS 8 or other methods used for accuracy testing of temperature, pressure, or flow monitoring devices. The written report shall also include the name, title, and signature of the responsible official who is certifying the accuracy of the report. When no excess emissions or exceedances have occurred or monitoring equipment has not been inoperative, repaired, or adjusted, such information shall be stated in the report. This information will be kept for a minimum of 5 years and made readily available to the Administrator or delegated State authority upon request.<br>63.567(e)(5)<br>If the total duration of excess emissions or control system parameter exceedances for the reporting period is less than 5 percent of the total operating time for the reporting period, and CMS downtime for the reporting period is less than 10 percent of the total operating time for the reporting period, only the summary report of §63.10(e)(3)(vi) of subpart A of this part shall be submitted, and the full excess emissions and continuous monitoring system performance report of paragraph (e)(4) of this section need not be submitted unless required by the Administrator.<br>63.567(e)(6)<br>If the total duration of excess emissions or process or control system parameter exceedances for the reporting period is 5 percent or greater of the total operating time for the reporting period, or the total CMS downtime for the reporting period is 10 percent or greater of the total operating time for the reporting period, both the summary report of §63.10(e)(3)(vi) of subpart A of this part and the excess emissions and continuous monitoring system performance report of paragraph (e)(4) of this section shall be submitted. |
| | 63.567(e)(5)<br>If the total duration of excess emissions or control system parameter exceedances for the reporting period is less than 5 percent of the total operating time for the reporting period, and CMS downtime for the reporting period is less than 10 percent of the total operating time for the reporting period, only the summary report of §63.10(e)(3)(vi) of subpart A of this part shall be submitted, and the full excess emissions and continuous monitoring system performance report of paragraph (e)(4) of this section need not be submitted unless required by the Administrator.<br>63.567(e)(6)<br>If the total duration of excess emissions or process or control system parameter exceedances for the reporting period is 5 percent or greater of the total operating time for the reporting period, or the total CMS downtime for the reporting period is 10 percent or greater of the total operating time for the reporting period, both the summary report of §63.10(e)(3)(vi) of subpart A of this part and the excess emissions and continuous monitoring system performance report of paragraph (e)(4) of this section shall be submitted. |
| 40 CFR 63.567(f) | 63.567(f) Vapor collection system of the terminal.<br>Each owner or operator of an affected source shall submit with the initial performance test and maintain in an accessible location on site an engineering report describing in detail the vent system, or vapor collection system, used to vent each vent stream to a control device. This report shall include all valves and vent pipes that could vent the stream to the atmosphere, thereby bypassing the control device, and identify which valves are car-sealed opened and which valves are car-sealed closed. |

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| 40 CFR 63.567(g) | 63.567(g)<br>If a vent system, or vapor collection system, containing valves that could divert the emission stream away from the control device is used, each owner or operator of an affected source shall keep for at least 5 years up-to-date, readily accessible continuous records of:<br>63.567(g)(1)<br>All periods when flow bypassing the control device is indicated if flow indicators are installed under §63.563(a)(1) and §63.564(b), and<br>63.567(g)(2)<br>All times when maintenance is performed on car-sealed valves, when the car-seal is broken, and when the valve position is changed (i.e., from open to closed for valves in the vent piping to the control device and from closed to open for valves that vent the stream directly or indirectly to the atmosphere bypassing the control device) if valves are monitored under §63.564(b). |
| 40 CFR 63.567(h) | 63.567(h)<br>The owner or operator of an affected source shall keep the vapor-tightness documentation required under §63.563(a)(4) on file at the source in a permanent form available for inspection. |
| 40 CFR 63.567(i) | 63.567(i) Vapor tightness test documentation for marine tank vessels.<br>The owner or operator of an affected source shall maintain a documentation file for each marine tank vessel loaded at that source to reflect current test results as determined by the appropriate method in §63.565(c)(1) and (2). Updates to this documentation file shall be made at least once per year. The owner or operator shall include, as a minimum, the following information in this documentation:<br>63.567(i)(1)<br>Test title;<br>63.567(i)(2)<br>Marine vessel owner and address;<br>63.567(i)(3)<br>Marine vessel identification number;<br>63.567(i)(4)<br>Loading time, according to §63.563(a)(4)(ii) or (iii), if appropriate;<br>63.567(i)(5)<br>Testing location;<br>63.567(i)(6)<br>Date of test;<br>63.567(i)(7)<br>Tester name and signature;<br>63.567(i)(8)<br>Test results from §63.565(c)(1) or (2), as appropriate;<br>63.567(i)(9)<br>Documentation provided under §63.563(a)(4)(ii) and (iii)(B) showing that the repair of leaking components attributed to a failure of a vapor-tightness test is technically infeasible without dry-docking the vessel; and<br>63.567(i)(10)<br>Documentation that a marine tank vessel failing a pressure test or leak test has been repaired. |

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| 40 CFR 63.567(j) | 63.567(j) Emission estimation reporting and recordkeeping procedures.<br>The owner or operator of each source complying with the emission limits specified in §63.562(b)(2), (3), and (4) shall comply with the following provisions:<br>63.567(j)(1)<br>Maintain records of all measurements, calculations, and other documentation used to identify commodities exempted under §63.560(d);<br>63.567(j)(2)<br>Keep readily accessible records of the emission estimation calculations performed in §63.565(l) for 5 years; and<br>63.567(j)(3)<br>Submit an annual report of the source's HAP control efficiency calculated using the procedures specified in §63.565(l), based on the source's actual throughput.<br>63.567(j)(4)<br>Owners or operators of marine tank vessel loading operations specified in §63.560(a)(3) shall retain records of the emissions estimates determined in §65.565(l) and records of their actual throughputs by commodity, for 5 years. |
| 40CFR 63.567(k) | 63.567(k) Leak detection and repair of vapor collection systems and control devices.<br>When each leak of the vapor collection system, or vapor collection system, and control device is detected and repaired as specified in §63.563(c) the following information required shall be maintained for 5 years:<br>63.567(k)(1)<br>Date of inspection;<br>63.567(k)(2)<br>Findings (location, nature, and severity of each leak);<br>63.567(k)(3)<br>Leak determination method;<br>63.567(k)(4)<br>Corrective action (date each leak repaired, reasons for repair interval); and<br>63.567(k)(5)<br>Inspector name and signature. |
| 40 CFR 63.567(m) | 63.567(m)<br>The number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded shall be stated in a semiannual report. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with § 63.562(e), including actions taken to correct a malfunction. The report, to be certified by the owner or operator or other responsible official, shall be submitted semiannually and delivered or postmarked by the 30th day following the end of each calendar half. |
| 40 CFR 63.567(n) | 63.567(n)(1)<br>As of January 1, 2012 and within 60 days after the date of completing each performance test, as defined in § 63.2, and as required in this subpart, you must submit performance test data, except opacity data, electronically to EPA's Central Data Exchange by using the ERT (see http://www.epa.gov/ttn/chief/ert/ert tool.html/) or other compatible electronic spreadsheet. Only data collected using test methods compatible with ERT are subject to this requirement to be submitted electronically into EPA's WebFIRE database.<br>63.567(n)(2)<br>All reports required by this subpart not subject to the requirements in paragraph (n)(1) of this section must be sent to the Administrator at the appropriate address listed in § 63.13. If acceptable to both the Administrator and the owner or operator of a source, these reports may be submitted on electronic media. The Administrator retains the right to require submittal of reports subject to paragraph (n)(1) of this section in paper format. |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

| ATTACHMENT E - Emission Unit Form | | |
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| ***Emission Unit Description:*** | | |
| **Emission unit ID number:** Engine #4 | **Emission unit name:** Clarke Loaded Fleet Fire Pump Engine | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** 510 hp diesel-fired emergency fire water pump engine | | |
| **Manufacturer:** John Deere | **Model number:** 6135HF485 | **Serial number:** |
| **Construction date:** 1/1/2015 | **Installation date:** 2/27/2015 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 510 hp | | |
| **Maximum Hourly Throughput:** 23.5 gal/hr | **Maximum Annual Throughput:** 11,750 gal/yr | **Maximum Operating Schedule:** 500 hrs/yr |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☒ Yes ☐ No | | **If yes, is it?** ☐ Indirect Fired ☒ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** 510 hp | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** Diesel | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| Diesel | 15 ppm | N/A | 19,300 Btu/lb |
| | | | |
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| ***Emissions Data*** | | |
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| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | 0.70 | 0.18 |
| Nitrogen Oxides ($NO_X$) | 3.65 | 0.91 |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | 0.14 | 0.04 |
| Particulate Matter ($PM_{10}$) | 0.14 | 0.04 |
| Total Particulate Matter (TSP) | 0.13 | 0.03 |
| Sulfur Dioxide ($SO_2$) | 0.01 | 1.39E-03 |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 0.14 | 0.04 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 3.33E-03 | 8.33E-04 |
| Ethylbenzene | N/A | N/A |
| Hexane | N/A | N/A |
| Toluene | 1.46E-03 | 3.65E-04 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | 1.02E-03 | 2.54E-04 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Emissions from the emergency fire water pump diesel-fired engine are calculated using the manufacturer's engine specifications (e.g., horsepower) and the manufacturer's emissions certification data with not-to-exceed (NTE) multipliers per 40 CFR 60.4212(c). MPLXT assumes a 500 hour-per-year operating limit since the engine is used only during emergencies. Emissions of SO2 are estimated based on a 15 ppm limit on sulfur content of diesel fuel pursuant to 40 CFR 60.4207(b) and 40 CFR 80.510(b). Refer to Attachment I for detailed emission calculations.

*Applicable Requirements*

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

As noted in the application narrative, MPLXT revised the facility-wide potential emissions to incorporate dock arrival and dock departure barge gauging/sampling emissions. When considering these emissions as a part of the facility-wide potential emissions, the Kenova-TriState Terminal has the potential to emit total and individual HAP in quantities greater than 25 and 10 tpy respectively. Therefore, upon submittal of this renewal application, the facility will be considered a major source of HAP. MPLXT proposes a period of three (3) years after submitting this renewal application to comply with the newly applicable provisions of 40 CFR 63 Subpart ZZZZ for the engine, which is consistent with the timeline specified in 40 CFR 63.6595(b)(2).

| **Requirement Citation** | **Requirement Text** |
|---|---|
| 40 CFR 60.4205(c) | Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.<br>NMHC+$NO_X$: 4.0 g/kW-hr (4.0 g/hp-hr)<br>PM: 0.20 g/kW-hr (0.15 g/hp-hr) |
| 40 CFR 60.4206 | Must operate and maintain the engine to achieve emission standards over the life of the engine. |
| 40 CFR 60.4207(b): | Must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel. |
| 40 CFR 60.4209(a) | Must install a non-resettable hour meter prior to the startup of the engine |
| 40 CFR 60.4211(c): | Demonstrate compliance by purchasing an engine certified to the emission standards in 60.4205(c). The engine must be installed and configured according to the manufacturer's emission-related specifications. |
| 40 CFR 60.4211(f) | No time limit on use in emergency situations. Up to 100 hours per year for maintenance checks/readiness testing, emergency demand response, or voltage/frequency deviation ≥ 5% below standard. 50 hours (of the 100) per year can be for non-emergency operation. Except as provided in 40 CFR 60.4211(f)(3)(i), the 50 hours per year for non-emergency situations cannot be used for peak shaving, non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity. |
| 40 CFR 63.6590(b) | An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of 63.6645(f)<br>(i)<br>The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for purposes specified in 63.6640(f)(2)(ii) and (iii). |
| 40 CFR 63.6600(c) | Owners and operators of an emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions does not need to comply with the emission limitations in Table 2a to this subpart or operating limitations in Table 2b to this subpart. |

| | |
|---|---|
| 40 CFR 63.6640(e) | Owners and operators of a new emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions do not need to comply with the requirements in Table 8 to this subpart, except for the initial notification requirements. |
| 40 CFR 63.6640(f)(1)-(2),(3): | No time limit on use in emergency situations. Up to 100 hours per year for maintenance checks/readiness testing, emergency demand response, or voltage/frequency deviation ≥ 5% below standard. 50 hours (of the 100) per year can be for non-emergency operation. The 50 hours per year for non-emergency situations cannot be used for peak shaving, non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity. |

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

| **Requirement Citation** | **Requirement Text** |
|---|---|
| 40 CFR 60.4214(b) | Not required to submit an initial notification. Must keep records of the operation of the engine in emergency and non-emergency service recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time. |
| 40 CFR 63.6645(f) | Required to submit an initial notification that includes the information in 63.9(b)(2)(i) through (v), and a statement that the stationary RICE has no additional requirements and explain the basis of the exclusion (i.e., it operates exclusively as an emergency stationary RICE with a rating of more than 500 brake HP located at a major source of HAP.) |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:** Distillate Barge Loading | **Emission unit name:** Distillate Barge Loading | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Distillate Barge Loading | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** N/A |
| **Construction date:** N/A | **Installation date:** N/A | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 8 barges/day | | |
| **Maximum Hourly Throughput:** 12,000 bbl/hr (distillate only) 6,000 bbl/hr (worst-case, when loading gasoline at max rate) | **Maximum Annual Throughput:** 73 million bbl/yr Distillate (if not loading gasoline) | **Maximum Operating Schedule:** 8,760 hours (if not loading gasoline) |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 6.0 (distillate only)<br>69.9 (worst-case loading) | 18.4 (distillate only)<br>179.4 (worst-case loading) |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.21E-03 (distillate only)<br>0.63 (worst-case loading) | 3.68E-03 (distillate only)<br>1.61 (worst-case loading) |
| Ethylbenzene | 2.42E-03 (distillate only)<br>0.07 (worst-case loading) | 0.01 (distillate only)<br>0.18 (worst-case loading) |
| Hexane | 6.05E-04 (distillate only)<br>1.12 (worst-case loading) | 1.84E-03 (distillate only)<br>2.87 (worst-case loading) |
| Toluene | 1.57E-02 (distillate only)<br>0.91 (worst-case loading) | 0.05 (distillate only)<br>2.33 (worst-case loading) |
| Trimethylpentane (2,2,4) | 0 (distillate only)<br>0.56 (worst-case loading) | 0 (distillate only)<br>1.43 (worst-case loading) |
| Xylene | 4.17E-02 (distillate only)<br>0.35 (worst-case loading) | 0.13 (distillate only)<br>0.90 (worst-case loading) |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

For distillate loading, AP-42 Section 5.2 Transportation and Marketing of Petroleum Liquids (6/2008) – Table 5.2.6. Note: Emissions presented above are for distillate-only barge loading and worst-case gasoline and distillate barge loading combined. Refer to Attachment I for detailed emission calculations.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

There are no applicable requirements for loading fuels other than gasoline, such as distillate or kerosene. Refer to the Emission Unit Form for Gasoline Barge Loading applicable requirements.

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|---|
| **For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**<br><br>N/A. |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:**<br>Cooling Tower | **Emission unit name:**<br>Cooling Tower | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Cooling tower with 400 gpm recirculation rate | | |
| **Manufacturer:**<br>N/A | **Model number:**<br>N/A | **Serial number:**<br>N/A |
| **Construction date:**<br>N/A | **Installation date:**<br>N/A | **Modification date(s):** |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):**<br>400 gpm | | |
| **Maximum Hourly Throughput:**<br>24,000 gph | **Maximum Annual Throughput:**<br>210,240,000 gpy | **Maximum Operating Schedule:**<br>8760 hrs/yr |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| ***Emissions Data*** | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | 3.20E-03 | 0.01 |
| Particulate Matter ($PM_{10}$) | 3.20E-03 | 0.01 |
| Total Particulate Matter (TSP) | 3.20E-03 | 0.01 |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | N/A | N/A |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | N/A | N/A |
| Ethylbenzene | N/A | N/A |
| Hexane | N/A | N/A |
| Toluene | N/A | N/A |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | N/A | N/A |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

AP-42 Section 13.4.2 (1/1995). Refer to Attachment I for detailed emissions calculations.

| *Applicable Requirements* |
|---|
| **List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**<br><br>No person shall cause, suffer, allow or permit any manufacturing process or storage structure generating fugitive particulate matter to operate that is not equipped with a system, which may include, but not be limited to, process equipment design, control equipment design or operation and maintenance procedures, to minimize the emissions of fugitive particulate matter. To minimize means such system shall be installed, maintained and operated to ensure the lowest fugitive particulate matter emissions reasonably achievable. **[45CSR7-5.1]** |
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| **For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**<br><br>MPLXT utilizes a conductivity controller to automatically sample the cooling water line. If the controller receives a sample outside the operating range, it will conduct a blowdown, thus preventing total dissolved solids from accumulating in the cooling water and minimizing particulate emissions. |
| **Are you in compliance with all applicable requirements for this emission unit?** _☒ Yes ☐ No<br><br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:**<br>Barge Arrival/Departure Gauging and Sampling | **Emission unit name:**<br>Barge Arrival/Departure Gauging and Sampling | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Emissions from depressurizing a barge vessel upon arrival at the dock and after loading the vessel, as well as from any sampling or gauging activities deemed necessary. | | |
| **Manufacturer:**<br>Marathon field constructed | **Model number:**<br>Marathon field constructed | **Serial number:**<br>N/A |
| **Construction date:**<br>N/A | **Installation date:**<br>N/A | **Modification date(s):**<br>N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 8 barges/day | | |
| **Maximum Hourly Throughput:**<br>N/A | **Maximum Annual Throughput:**<br>73 million bbl/yr | **Maximum Operating Schedule:**<br>8,760 hours/yr |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.0 – 460.6 lb/event | 427.3 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 0.0 – 4.1 lb/event | 3.8 |
| Ethylbenzene | 0.0 – 0.5 lb/event | 0.4 |
| Hexane | 0.0 – 7.4 lb/event | 6.8 |
| Toluene | 0.0 – 6.0 lb/event | 5.6 |
| Trimethylpentane (2,2,4) | 0.0 – 3.7 lb/event | 3.4 |
| Xylene | 0.0 – 2.3 lb/event | 2.1 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

The dockside arrival emissions are determined based on the vessel depressurization equations (Eq. 3-18 - 3-20) from the August 2007 EPA document, "Methods for Estimating Air Emissions from Chemical Manufacturing Facilities," Volume II: Chapter 16. The calculation for dockside departure emissions uses the same depressurization equations. An evaporation factor is included for emissions during sampling based on an estimated product displacement that occurs during sampling. MPLXT plans to capture and control the dockside arrival emissions using the existing VRU at 97% control efficiency (see Section 3.5 below).

Short-term emissions are presented as lb/event values instead of lb/hr values. Emissions per event will vary greatly depending on several variables, including the material that was previously stored in the vessel, what material is loaded, ambient conditions, and whether there is pressure on the marine vessel upon arrival at the terminal.

Annual emissions represent worst-case conditions and assumptions. Refer to Attachment I for detailed emission calculations.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

MPLXT is requesting an operational limit to require the capture and control of dock arrival emissions using the existing VRU that is subject to MACT Y control requirements pursuant to 45CSR30-12.7.

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|---|
| **For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**<br><br>The existing VRU is already subject to monitoring, recordkeeping, and reporting requirements under MACT Y, therefore no additional MRR requirements are necessary. Refer to the Emission Unit Form for Gasoline Barge Loading for the MACT Y MMR requirements. |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:**<br>Engine #5 | **Emission unit name:**<br>Engine for Godwin WW Liftstation Backup Pump | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>66 hp diesel-fired engine | | |
| **Manufacturer:**<br>Isuzu | **Model number:**<br>CP-4LE2X | **Serial number:**<br>4LE2XDPCA-02 |
| **Construction date:**<br>2/1/2018 | **Installation date:**<br>11/1/2018 | **Modification date(s):**<br>N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):**<br>66 hp | | |
| **Maximum Hourly Throughput:**<br>3.46 gal/hr | **Maximum Annual Throughput:**<br>30,318 gal/yr | **Maximum Operating Schedule:**<br>8,760 hrs/yr |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☒ Yes ☐ No | | **If yes, is it?**<br>☐ Indirect Fired ☒ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>66 hp | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>Diesel | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| Diesel | 15 ppm | N/A | 19300 Btu/lb |
| | | | |
| | | | |

| ***Emissions Data*** | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | 0.68 | 2.96 |
| Nitrogen Oxides ($NO_X$) | 0.52 | 2.26 |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | 5.46E-03 | 2.39E-02 |
| Particulate Matter ($PM_{10}$) | 5.46E-03 | 2.39E-02 |
| Total Particulate Matter (TSP) | 4.86E-03 | 2.13E-02 |
| Sulfur Dioxide ($SO_2$) | 7.14E-04 | 3.13E-03 |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 0.25 | 1.07 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 4.29E-04 | 1.88E-03 |
| Ethylbenzene | N/A | N/A |
| Hexane | N/A | N/A |
| Toluene | 1.88E-04 | 8.24E-04 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | 1.31E-04 | 5.74E-04 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Emission estimates based on the Tier 4 engine standards with the Not-to-Exceed (NTE) multipliers per 40 CFR 1039.101(e). Emissions of SO2 are estimated based on a 15 ppm limit on sulfur content of diesel fuel pursuant to 40 CFR 60.4207(b) and 40 CFR 80.510(b). Refer to Attachment I for detailed emission calculations.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

| Requirement Citation | Requirement Text |
|---|---|
| 40 CFR 63.6590(c) | An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part. |
| 40 CFR 60.4204(b) | Owners and operators of 2007 model year and later non-emergency stationary CI ICE with a displacement of less than 30 liters per cyclinder must comply with the emission standards for new CI engines in §60.4201 for their 2007 model year and later stationary ICE, as applicable. |
| 40 CFR 60.4206 | Must operate and maintain the engine to achieve emission standards over the life of the engine. |
| 40 CFR 60.4207(b) | Must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel. |
| 40 CFR 60.4211(c) | Demonstrate compliance by purchasing an engine certified to the emission standards in 60.4204(b). The engine must be installed and configured according to the manufacturer's emission-related specifications. |

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

| Requirement Citation | Requirement Text |
|---|---|
| N/A | N/A |
| | |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 273 | **Emission unit name:** Tank 273 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Cone Roof Storage Tank (Fixed Roof) - Biodiesel / #2 Diesel | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 2012 | **Installation date:** 2012 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 957,600 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 65,167,019 | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 64.0 | 10.85 |

| Hazardous Air Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Benzene | N/A | N/A |
| Ethylbenzene | N/A | N/A |
| Hexane | N/A | N/A |
| Toluene | N/A | N/A |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | N/A | N/A |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on biodiesel.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

For Tank 273, the permittee shall not exceed the emission limits provided in the table below:

| **Regulated Pollutant** | **Maximum Emissions** | |
|---|---|---|
| | **lbs/hr** | **tpy** |
| Volatile Organic Compounds (VOCs) | 64 | 10.85 |
| Napthalene | 0.78 | 0.01 |
| Total Hazardous Air Pollutants (HAPs) | 0.78 | 0.01 |

**[45CSR13 - Permit R13-2277, Condition 4.1.3. *(Tank 273)*]**

For Tank 273, the permittee shall not exceed an annual throughput of 65,167,019 gallons or 77 tank turnovers per year on a 12 month rolling average.
**[45CSR13 - Permit R13-2277, Condition 4.1.4. *(Tank 273)*]**

The permittee shall store only biodiesel or #2 diesel fuel in Tank 273.
**[45CSR13 - Permit R13-2277, Condition 4.1.5. *(Tank 273)*]**

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

For the purpose of determining compliance with 45CSR21, 40 CFR 60, Subpart Kb, and 40 CFR 63, Subpart R, the facility shall maintain records for Tank 273 of the volatile organic liquid stored, the period of storage, and the maximum true vapor pressure of the volatile organic liquid during the respected storage period. Records shall be maintained on site for a period of five (5) years. Certified copies of these records shall be made available to the Director or his duly authorized representative upon request.
**[45CSR13 - Permit R13-2277 *(Tank 273)*, Condition B.6. 4.4.6., 45CSR§21-28.5. *(Tank 273)***

For the purpose of determining compliance with the maximum throughput limits, the maximum hourly and annual emission limits, and the applicable material restrictions, the facility shall maintain daily, monthly, and 12-month rolling average records of the material, unloading time, and the throughput and number of turnovers for Tank 273. Records shall be maintained on site for a period of five (5) years. Certified copies of these records shall be made available to the Director or his duly authorized representative upon request.
**[45CSR13 - Permit R13-2277, Condition 4.4.5. *(Tank 273)*]**

The permittee shall keep records of monitoring information that include the following:

a. The date, place as defined in this permit and time of sampling or measurements;
b. The date(s) analyses were performed;
c. The company or entity that performed the analyses;
d. The analytical techniques or methods used;
e. The results of the analyses; and
f. The operating conditions existing at the time of sampling or measurement.

**[45CSR13 - Permit R13-2277, Condition 4.4.1.]**

The permittee shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:

a. The name and location of the facility;
b. The subject sources that caused the excess emissions;
c. The time and date of first observation of the excess emissions;
d. The cause and expected duration of the excess emissions;
e. The estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and
f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.

**[45CSR13 - Permit R13-2277, Condition 4.5.3.]**

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| | | |
|---|---|---|
| ***Emission Unit Description*** | | |
| **Emission unit ID number:** Tank 272 | **Emission unit name:** Tank 272 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline /distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 2001 | **Installation date:** 2001 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2,377,200 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,533,000,000 gallons (R13-2277C) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.08 | 4.72 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.1E-02 | 5.0E-02 |
| Ethylbenzene | 2.3E-03 | 1.0E-02 |
| Hexane | 2.1E-02 | 9.0E-02 |
| Toluene | 1.6E-02 | 7.0E-02 |
| Trimethylpentane (2,2,4) | 1.1E-02 | 5.0E-02 |
| Xylene | 6.8E-03 | 3.0E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

The permittee shall maintain the maximum annual emissions and maximum annual throughput, in accordance with the following limits:

a. Maximum annual emissions of hazardous air pollutants (HAPs) and non-HAP volatile organic compounds (VOCs) for each tank shall not exceed the following:

| | **Tank 270** | | **Tank 271** | | **Tank 272** | | **Total** | |
|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **lb/year** | **TPY** | **lb/year** | **TPY** | **lb/year** | **TPY** | **lb/year** | **TPY** |
| Benzene | 94.75 | 0.05 | 94.75 | 0.05 | 94.75 | 0.05 | 284.25 | 0.14 |
| Ethyl Benzene | 10.53 | 0.01 | 10.53 | 0.01 | 10.53 | 0.01 | 31.58 | 0.02 |
| Hexane | 168.44 | 0.09 | 168.44 | 0.09 | 168.44 | 0.09 | 505.33 | 0.25 |
| Toluene | 136.86 | 0.07 | 136.86 | 0.07 | 136.86 | 0.07 | 410.58 | 0.21 |
| Trimethylpentane (2,2,4) | 84.22 | 0.05 | 84.22 | 0.05 | 84.22 | 0.05 | 252.66 | 0.13 |
| Xylene | 52.64 | 0.03 | 52.64 | 0.03 | 52.64 | 0.03 | 157.92 | 0.08 |
| non-HAP VOCs | 8884.26 | 4.44 | 8884.26 | 4.44 | 8884.26 | 4.44 | 29938 | 14.96 |

b. The maximum annual throughput for each tank shall not exceed 1,533 million gallons per year (36,500,000 barrels per year).
**[45CSR13 - Permit R13-2277, Conditions 4.1.1. and 4.1.2. *(Tanks 270, 271, and 272)*]**

**Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed for Tanks 270, 271, and 272 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
**[45CSR13 - Permit R13-2277, Condition 4.1.10. *(Tanks 270, 271, 272)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

For the purpose of determining compliance with the maximum throughput limits set forth in Section 4.1.2.b. of Permit R30-09900100-2015 and the maximum emission limits set forth in Section 4.1.2.a. of Permit R30-09900100-2015, the facility shall maintain daily, monthly, and annual records of throughput for each tank. Records shall be maintained on site for a period of five (5) years. Certified copies of these records shall be made available to the Director or his duly authorized representative upon request.
**[45CSR13 - Permit R13-2277, Condition 4.4.4. *(Tanks 270, 271, 272)*]**

**Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
a. The date, place as defined in this permit and time of sampling or measurements;
b. The date(s) analyses were performed;
c. The company or entity that performed the analyses;
d. The analytical techniques or methods used;
e. The results of the analyses; and
f. The operating conditions existing at the time of sampling or measurement.
**[45CSR13 - Permit R13-2277, Condition 4.4.1.]**

**Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 - Permit R13-2277, Condition 4.4.2. *(Tanks 270, 271, 272)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 - Permit R13-2277, Condition 4.4.3. *(Tanks 270, 271, 272)*]**

The permittee shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:

| |
|---|
| a. The name and location of the facility;<br>b. The subject sources that caused the excess emissions;<br>c. The time and date of first observation of the excess emissions;<br>d. The cause and expected duration of the excess emissions;<br>e. The estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and<br>f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.<br>**[45CSR13 - Permit R13-2277, Condition 4.5.3.]**<br><br>Please refer also to Table E-2. Applicable Requirements for IFR Tanks |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

## ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 271 | **Emission unit name:** Tank 271 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline /distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 2001 | **Installation date:** 2001 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2,377,200 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,533,000,000 gallons (R13-2277C) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |

| | | |
|---|---|---|
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.08 | 4.72 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.1E-02 | 5.0E-02 |
| Ethylbenzene | 2.3E-03 | 1.0E-02 |
| Hexane | 2.1E-02 | 9.0E-02 |
| Toluene | 1.6E-02 | 7.0E-02 |
| Trimethylpentane (2,2,4) | 1.1E-02 | 5.0E-02 |
| Xylene | 6.8E-03 | 3.0E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

The permittee shall maintain the maximum annual emissions and maximum annual throughput, in accordance with the following limits:

a. Maximum annual emissions of hazardous air pollutants (HAPs) and non-HAP volatile organic compounds (VOCs) for each tank shall not exceed the following:

| Pollutant | Tank 270 | | Tank 271 | | Tank 272 | | Total | |
|---|---|---|---|---|---|---|---|---|
| | lb/year | TPY | lb/year | TPY | lb/year | TPY | lb/year | TPY |
| Benzene | 94.75 | 0.05 | 94.75 | 0.05 | 94.75 | 0.05 | 284.25 | 0.14 |
| Ethyl Benzene | 10.53 | 0.01 | 10.53 | 0.01 | 10.53 | 0.01 | 31.58 | 0.02 |
| Hexane | 168.44 | 0.09 | 168.44 | 0.09 | 168.44 | 0.09 | 505.33 | 0.25 |
| Toluene | 136.86 | 0.07 | 136.86 | 0.07 | 136.86 | 0.07 | 410.58 | 0.21 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Trimethylpentane (2,2,4) | 84.22 | 0.05 | 84.22 | 0.05 | 84.22 | 0.05 | 252.66 | 0.13 |
| Xylene | 52.64 | 0.03 | 52.64 | 0.03 | 52.64 | 0.03 | 157.92 | 0.08 |
| non-HAP VOCs | 8884.26 | 4.44 | 8884.26 | 4.44 | 8884.26 | 4.44 | 29938 | 14.96 |

b. The maximum annual throughput for each tank shall not exceed 1,533 million gallons per year (36,500,000 barrels per year).
**[45CSR13 - Permit R13-2277, Conditions 4.1.1. and 4.1.2. *(Tanks 270, 271, and 272)*]**

**Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed for Tanks 270, 271, and 272 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
**[45CSR13 - Permit R13-2277, Condition 4.1.10. *(Tanks 270, 271, 272)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

For the purpose of determining compliance with the maximum throughput limits set forth in Section 4.1.2.b. of Permit R30-09900100-2015 and the maximum emission limits set forth in Section 4.1.2.a. of Permit R30-09900100-2015, the facility shall maintain daily, monthly, and annual records of throughput for each tank. Records shall be maintained on site for a period of five (5) years. Certified copies of these records shall be made available to the Director or his duly authorized representative upon request.
**[45CSR13 - Permit R13-2277, Condition 4.4.4. *(Tanks 270, 271, 272)*]**

**Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
a. The date, place as defined in this permit and time of sampling or measurements;
b. The date(s) analyses were performed;
c. The company or entity that performed the analyses;
d. The analytical techniques or methods used;
e. The results of the analyses; and
f. The operating conditions existing at the time of sampling or measurement.
**[45CSR13 - Permit R13-2277, Condition 4.4.1.]**

**Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 - Permit R13-2277, Condition 4.4.2. *(Tanks 270, 271, 272)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.

g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 - Permit R13-2277, Condition 4.4.3. *(Tanks 270, 271, 272)*]**

The permittee shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:
a. The name and location of the facility;
b. The subject sources that caused the excess emissions;
c. The time and date of first observation of the excess emissions;
d. The cause and expected duration of the excess emissions;
e. The estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and
f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.
**[45CSR13 - Permit R13-2277, Condition 4.5.3.]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 270 | **Emission unit name:** Tank 270 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 2001 | **Installation date:** 2001 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2,377,200 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,533,000,000 gallons (R13-2277C) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.08 | 4.72 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.1E-02 | 5.0E-02 |
| Ethylbenzene | 2.3E-03 | 1.0E-02 |
| Hexane | 2.1E-02 | 9.0E-02 |
| Toluene | 1.6E-02 | 7.0E-02 |
| Trimethylpentane (2,2,4) | 1.1E-02 | 5.0E-02 |
| Xylene | 6.8E-03 | 3.0E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

The permittee shall maintain the maximum annual emissions and maximum annual throughput, in accordance with the following limits:

a. Maximum annual emissions of hazardous air pollutants (HAPs) and non-HAP volatile organic compounds (VOCs) for each tank shall not exceed the following:

| | **Tank 270** | | **Tank 271** | | **Tank 272** | | Total | |
|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **lb/year** | **TPY** | **lb/year** | **TPY** | **lb/year** | **TPY** | **lb/year** | **TPY** |
| Benzene | 94.75 | 0.05 | 94.75 | 0.05 | 94.75 | 0.05 | 284.25 | 0.14 |
| Ethyl Benzene | 10.53 | 0.01 | 10.53 | 0.01 | 10.53 | 0.01 | 31.58 | 0.02 |
| Hexane | 168.44 | 0.09 | 168.44 | 0.09 | 168.44 | 0.09 | 505.33 | 0.25 |
| Toluene | 136.86 | 0.07 | 136.86 | 0.07 | 136.86 | 0.07 | 410.58 | 0.21 |
| Trimethylpentane (2,2,4) | 84.22 | 0.05 | 84.22 | 0.05 | 84.22 | 0.05 | 252.66 | 0.13 |
| Xylene | 52.64 | 0.03 | 52.64 | 0.03 | 52.64 | 0.03 | 157.92 | 0.08 |
| non-HAP VOCs | 8884.26 | 4.44 | 8884.26 | 4.44 | 8884.26 | 4.44 | 29938 | 14.96 |

b. The maximum annual throughput for each tank shall not exceed 1,533 million gallons per year (36,500,000 barrels per year).
**[45CSR13 - Permit R13-2277, Conditions 4.1.1. and 4.1.2. *(Tanks 270, 271, and 272)*]**

**Operation and Maintenance of Air Pollution Control Equipment.** The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment listed for Tanks 270, 271, and 272 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
**[45CSR13 - Permit R13-2277, Condition 4.1.10. *(Tanks 270, 271, 272)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

For the purpose of determining compliance with the maximum throughput limits set forth in Section 4.1.2.b. of Permit R30-09900100-2015 and the maximum emission limits set forth in Section 4.1.2.a. of Permit R30-09900100-2015, the facility shall maintain daily, monthly, and annual records of throughput for each tank. Records shall be maintained on site for a period of five (5) years. Certified copies of these records shall be made available to the Director or his duly authorized representative upon request.
**[45CSR13 - Permit R13-2277, Condition 4.4.4. *(Tanks 270, 271, 272)*]**

**Record of Monitoring.** The permittee shall keep records of monitoring information that include the following:
a. The date, place as defined in this permit and time of sampling or measurements;
b. The date(s) analyses were performed;
c. The company or entity that performed the analyses;
d. The analytical techniques or methods used;
e. The results of the analyses; and
f. The operating conditions existing at the time of sampling or measurement.
**[45CSR13 - Permit R13-2277, Condition 4.4.1.]**

**Record of Maintenance of Air Pollution Control Equipment.** For all pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 - Permit R13-2277, Condition 4.4.2. *(Tanks 270, 271, 272)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 - Permit R13-2277, Condition 4.4.3. (Tanks 270, 271, 272)]**

| |
|---|
| The permittee shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:<br>a. The name and location of the facility;<br>b. The subject sources that caused the excess emissions;<br>c. The time and date of first observation of the excess emissions;<br>d. The cause and expected duration of the excess emissions;<br>e. The estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and<br>f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.<br>**[45CSR13 - Permit R13-2277, Condition 4.5.3.]**<br><br>Please refer also to Table E-2. Applicable Requirements for IFR Tanks |
| **Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No<br>If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**. |

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 268 | **Emission unit name:** Tank 268 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1993 | **Installation date:** 1993 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 1,793,400 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,134,000,000 gallons (R13-1352A) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.63 | 2.73 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.6E-03 | 2.5E-02 |
| Ethylbenzene | 6.2E-04 | 2.7E-03 |
| Hexane | 1.0E-02 | 4.4E-02 |
| Toluene | 8.1E-03 | 3.5E-02 |
| Trimethylpentane (2,2,4) | 5.0E-03 | 2.2E-02 |
| Xylene | 3.1E-03 | 1.4E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Emissions to the atmosphere of volatile organic compounds (VOC) from operations associated with the following tanks shall not exceed the following:

| Tank | lbm/hr | lbm/yr |
|---|---|---|
| 268 | 0.63 | 5457 |

**45CSR13 – Permit No. R13-1352, Condition 4.1.5. *(Tanks 265, 266, 267, & 268)*]**

Annual throughput of gasoline through each of the four (4) permitted tanks (265, 266, 267, 268) shall not exceed 1134 x $10^6$ gallons per year. For the purposes of this permit, a calendar year is defined as any one of a series of twelve consecutive months.
**[45CSR13 – Permit No. R13-1352, Condition 4.1.6. *(Tanks 265, 266, 267, & 268)*]**

**Operation and Maintenance of Air Pollution Control Equipment**. The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan

approved by the Secretary.
**[45CSR§13-5.11.; 45CSR13 – Permit No. R13-1352, Condition 4.1.8. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

The permittee shall record the throughput of gasoline through associated tanks on a monthly and yearly basis. These records shall be maintained on site for a period of no less than five (5) years for inspection by the Director or a duly authorized representative of the Director.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.5.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

Annual emissions shall be calculated by the fifteenth day of the subsequent month utilizing the equations listed in Section 7.1.3.2 of AP-42. A twelve month running total of emissions will be maintained to verify compliance with the long term emission limitations. Each month a new twelve month total shall be calculated using the previous twelve months data. Compliance with the hourly emission limits shall be demonstrated by dividing the monthly calculated annual emissions by the number of hours in a year to obtain an hourly average. Records indicating the hourly and twelve month rolling total emissions shall be maintained for a period of no less than five (5) years.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.6.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

**Record of Maintenance of Air Pollution Control Equipment.** For all relevant pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.2. *(Tanks 265, 266, 267, 268)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.3. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 267 | **Emission unit name:** Tank 267 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1993 | **Installation date:** 1993 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 1,797,600 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,134,000,000 gallons (R13-1352A) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.63 | 2.73 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.6E-03 | 2.5E-02 |
| Ethylbenzene | 6.2E-04 | 2.7E-03 |
| Hexane | 1.0E-02 | 4.4E-02 |
| Toluene | 8.1E-03 | 3.5E-02 |
| Trimethylpentane (2,2,4) | 5.0E-03 | 2.2E-02 |
| Xylene | 3.1E-03 | 1.4E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Emissions to the atmosphere of volatile organic compounds (VOC) from operations associated with the following tanks shall not exceed the following:

| **Tank** | **lbm/hr** | **lbm/yr** |
|---|---|---|
| 267 | 0.63 | 5457 |

**45CSR13 – Permit No. R13-1352, Condition 4.1.5. *(Tanks 265, 266, 267, & 268)*]**

Annual throughput of gasoline through each of the four (4) permitted tanks (265, 266, 267, 268) shall not exceed 1134 x $10^6$ gallons per year. For the purposes of this permit, a calendar year is defined as any one of a series of twelve consecutive months.
**[45CSR13 – Permit No. R13-1352, Condition 4.1.6. *(Tanks 265, 266, 267, & 268)*]**

**Operation and Maintenance of Air Pollution Control Equipment**. The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan

approved by the Secretary.
**[45CSR§13-5.11.; 45CSR13 – Permit No. R13-1352, Condition 4.1.8. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

The permittee shall record the throughput of gasoline through associated tanks on a monthly and yearly basis. These records shall be maintained on site for a period of no less than five (5) years for inspection by the Director or a duly authorized representative of the Director.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.5.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

Annual emissions shall be calculated by the fifteenth day of the subsequent month utilizing the equations listed in Section 7.1.3.2 of AP-42. A twelve month running total of emissions will be maintained to verify compliance with the long term emission limitations. Each month a new twelve month total shall be calculated using the previous twelve months data. Compliance with the hourly emission limits shall be demonstrated by dividing the monthly calculated annual emissions by the number of hours in a year to obtain an hourly average. Records indicating the hourly and twelve month rolling total emissions shall be maintained for a period of no less than five (5) years.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.6.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

**Record of Maintenance of Air Pollution Control Equipment.** For all relevant pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.2. *(Tanks 265, 266, 267, 268)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.3. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 266 | **Emission unit name:** Tank 266 | **List any control devices associated with this emission unit:** N/A |

**Provide a description of the emission unit (type, method of operation, design parameters, etc.):**
Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.)

| | | |
|---|---|---|
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1993 | **Installation date:** 1993 | **Modification date(s):** N/A |

**Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 1,810,200 gallons (shell capacity from OIS 2014)

| | | |
|---|---|---|
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,134,000,000 gallons (R13-1352A) | **Maximum Operating Schedule:** 8,760 hours |

***Fuel Usage Data* (fill out all applicable fields)**

**Does this emission unit combust fuel?** ☐ Yes ☒ No

**If yes, is it?** ☐ Indirect Fired ☐ Direct Fired

**Maximum design heat input and/or maximum horsepower rating:** N/A

**Type and Btu/hr rating of burners:** N/A

**List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**
N/A

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.63 | 2.73 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.6E-03 | 2.5E-02 |
| Ethylbenzene | 6.2E-04 | 2.7E-03 |
| Hexane | 1.0E-02 | 4.4E-02 |
| Toluene | 8.1E-03 | 3.5E-02 |
| Trimethylpentane (2,2,4) | 5.0E-03 | 2.2E-02 |
| Xylene | 3.1E-03 | 1.4E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Emissions to the atmosphere of volatile organic compounds (VOC) from operations associated with the following tanks shall not exceed the following:

| Tank | lbm/hr | lbm/yr |
|---|---|---|
| 266 | 0.63 | 5457 |

**45CSR13 – Permit No. R13-1352, Condition 4.1.5. *(Tanks 265, 266, 267, & 268)*]**

Annual throughput of gasoline through each of the four (4) permitted tanks (265, 266, 267, 268) shall not exceed 1134 x $10^6$ gallons per year. For the purposes of this permit, a calendar year is defined as any one of a series of twelve consecutive months.
**[45CSR13 – Permit No. R13-1352, Condition 4.1.6. *(Tanks 265, 266, 267, & 268)*]**

**Operation and Maintenance of Air Pollution Control Equipment**. The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan

approved by the Secretary.
**[45CSR§13-5.11.; 45CSR13 – Permit No. R13-1352, Condition 4.1.8. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

The permittee shall record the throughput of gasoline through associated tanks on a monthly and yearly basis. These records shall be maintained on site for a period of no less than five (5) years for inspection by the Director or a duly authorized representative of the Director.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.5.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

Annual emissions shall be calculated by the fifteenth day of the subsequent month utilizing the equations listed in Section 7.1.3.2 of AP-42. A twelve month running total of emissions will be maintained to verify compliance with the long term emission limitations. Each month a new twelve month total shall be calculated using the previous twelve months data. Compliance with the hourly emission limits shall be demonstrated by dividing the monthly calculated annual emissions by the number of hours in a year to obtain an hourly average. Records indicating the hourly and twelve month rolling total emissions shall be maintained for a period of no less than five (5) years.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.6.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

**Record of Maintenance of Air Pollution Control Equipment.** For all relevant pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.2. *(Tanks 265, 266, 267, 268)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.3. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:** Tank 265 | **Emission unit name:** Tank 265 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1991 | **Installation date:** 1991 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 1,377,600 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,134,000,000 gallons (R13-1352A) | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| ***Emissions Data*** | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |

| | | |
|---|---|---|
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.64 | 2.81 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.8E-03 | 2.5E-02 |
| Ethylbenzene | 6.4E-04 | 2.8E-03 |
| Hexane | 1.0E-02 | 4.5E-02 |
| Toluene | 8.3E-03 | 3.6E-02 |
| Trimethylpentane (2,2,4) | 5.1E-03 | 2.2E-02 |
| Xylene | 3.2E-03 | 1.4E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

Potential emissions presented above reflect the R13 permit limits, as applicable.

Attachment I contains potential emission calculations based on TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Emissions to the atmosphere of volatile organic compounds (VOC) from operations associated with the following tanks shall not exceed the following:

| Tank | lbm/hr | lbm/yr |
|---|---|---|
| 265 | 0.64 | 5614 |

**45CSR13 – Permit No. R13-1352, Condition 4.1.5. *(Tanks 265, 266, 267, & 268)*]**

Annual throughput of gasoline through each of the four (4) permitted tanks (265, 266, 267, 268) shall not exceed 1134 x $10^6$ gallons per year. For the purposes of this permit, a calendar year is defined as any one of a series of twelve consecutive months.
**[45CSR13 – Permit No. R13-1352, Condition 4.1.6. *(Tanks 265, 266, 267, & 268)*]**

**Operation and Maintenance of Air Pollution Control Equipment**. The permittee shall, to the extent practicable, install, maintain, and operate all pollution control equipment and associated monitoring equipment in a manner

consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary.
**[45CSR§13-5.11.; 45CSR13 – Permit No. R13-1352, Condition 4.1.8. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

The permittee shall record the throughput of gasoline through associated tanks on a monthly and yearly basis. These records shall be maintained on site for a period of no less than five (5) years for inspection by the Director or a duly authorized representative of the Director.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.5.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

Annual emissions shall be calculated by the fifteenth day of the subsequent month utilizing the equations listed in Section 7.1.3.2 of AP-42. A twelve month running total of emissions will be maintained to verify compliance with the long term emission limitations. Each month a new twelve month total shall be calculated using the previous twelve months data. Compliance with the hourly emission limits shall be demonstrated by dividing the monthly calculated annual emissions by the number of hours in a year to obtain an hourly average. Records indicating the hourly and twelve month rolling total emissions shall be maintained for a period of no less than five (5) years.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.6.; 45CSR§30-5.1.c. *(Tanks 265, 266, 267, & 268)*]**

**Record of Maintenance of Air Pollution Control Equipment.** For all relevant pollution control equipment, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.2. *(Tanks 265, 266, 267, 268)*]**

**Record of Malfunctions of Air Pollution Control Equipment.** For all relevant air pollution control equipment, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:
a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.
For each such case associated with an equipment malfunction, the additional information shall also be recorded:
e. The cause of the malfunction.
f. Steps taken to correct the malfunction.
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.
**[45CSR13 – Permit No. R13-1352, Condition 4.4.3. *(Tanks 265, 266, 267, 268)*]**

Please refer also to Table E-2. Applicable Requirements for IFR Tanks

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

***Emission Unit Description***

| **Emission unit ID number:** | **Emission unit name:** | **List any control devices associated with this emission unit:** N/A |
|---|---|---|
| Tank 264 | Tank 264 | |

**Provide a description of the emission unit (type, method of operation, design parameters, etc.):**
Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.)

| **Manufacturer:** | **Model number:** | **Serial number:** |
|---|---|---|
| N/A | N/A | N/A |
| **Construction date:** | **Installation date:** | **Modification date(s):** |
| 1990 | 1990 | N/A |

**Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 3,838,800 gallons (shell capacity from OIS 2014)

| **Maximum Hourly Throughput:** | **Maximum Annual Throughput:** | **Maximum Operating Schedule:** |
|---|---|---|
| N/A | 886,692,240 gallons | 8,760 hours |

***Fuel Usage Data* (fill out all applicable fields)**

**Does this emission unit combust fuel?** ☐ Yes ☒ No

**If yes, is it?**
☐ Indirect Fired ☐ Direct Fired

**Maximum design heat input and/or maximum horsepower rating:**
N/A

**Type and Btu/hr rating of burners:**
N/A

**List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**
N/A

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.57 | 2.51 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 5.16E-03 | 2.26E-02 |
| Ethylbenzene | 5.73E-04 | 2.51E-03 |
| Hexane | 9.17E-03 | 4.01E-02 |
| Toluene | 7.45E-03 | 3.26E-02 |
| Trimethylpentane (2,2,4) | 4.58E-03 | 2.01E-02 |
| Xylene | 2.86E-03 | 1.25E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 262 | **Emission unit name:** Tank 262 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Vertical fixed cone roof distillate storage tank (Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 1971 | **Installation date:** 1971 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 6,631,800 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 2,213,571,528 gallons | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.76 | 7.71 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 3.5E-04 | 1.5E-03 |
| Ethylbenzene | 7.0E-04 | 3.1E-03 |
| Hexane (-n) | 1.8E-04 | 7.7E-04 |
| Toluene | 4.6E-03 | 2.0E-02 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | 1.2E-02 | 5.3E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on the material with the highest vapor pressure which is kerosene. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

N/A

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

N/A

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 261 | **Emission unit name:** Tank 261 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Vertical fixed cone roof distillate storage tank (Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 1968 | **Installation date:** 1968 | **Modification date(s):** 1992 |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 6,631,800 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 2,170,264,874 gallons | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data*** Refer to Attachment I for Detailed Emissions Calculations

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 1.74 | 7.62 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 3.5E-04 | 1.5E-03 |
| Ethylbenzene | 7.0E-04 | 3.0E-03 |
| Hexane | 1.7E-04 | 7.6E-04 |
| Toluene | 4.5E-03 | 2.0E-02 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | 1.2E-02 | 5.3E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on the material with the highest vapor pressure which is kerosene. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

N/A

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

N/A

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:**<br>Tank 260 | **Emission unit name:**<br>Tank 260 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:**<br>Marathon field constructed | **Model number:**<br>Marathon field constructed | **Serial number:**<br>Marathon field constructed |
| **Construction date:**<br>1968 | **Installation date:**<br>1968 | **Modification date(s):**<br>2002 |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 4,985,400 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:**<br>N/A | **Maximum Annual Throughput:**<br>1,821,252,132 gallons | **Maximum Operating Schedule:**<br>8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| ***Emissions Data*** | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.28 | 5.60 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.15E-02 | 5.04E-02 |
| Ethylbenzene | 1.28E-03 | 5.60E-03 |
| Hexane | 2.04E-02 | 8.95E-02 |
| Toluene | 1.66E-02 | 7.27E-02 |
| Trimethylpentane (2,2,4) | 1.02E-02 | 4.48E-02 |
| Xylene | 6.39E-03 | 2.80E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:**<br>Tank 259 | **Emission unit name:**<br>Tank 259 | **List any control devices associated with this emission unit:** N/A |

**Provide a description of the emission unit (type, method of operation, design parameters, etc.):**
Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.)

| | | |
|---|---|---|
| **Manufacturer:**<br>Marathon field constructed | **Model number:**<br>Marathon field constructed | **Serial number:**<br>Marathon field constructed |
| **Construction date:**<br>1951 | **Installation date:**<br>1951 | **Modification date(s):**<br>2001 |

**Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 4,653,600 gallons (shell capacity from 2014 OIS)

| | | |
|---|---|---|
| **Maximum Hourly Throughput:**<br>N/A | **Maximum Annual Throughput:**<br>1,864,196,964 gallons | **Maximum Operating Schedule:**<br>8,760 hours |

***Fuel Usage Data* (fill out all applicable fields)**

| | |
|---|---|
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | **Type and Btu/hr rating of burners:**<br>N/A |

**List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**
N/A

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data*** Refer to Attachment I for Detailed Emissions Calculations

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.27 | 5.55 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.14E-02 | 4.99E-02 |
| Ethylbenzene | 1.27E-03 | 5.55E-03 |
| Hexane | 2.03E-02 | 8.88E-02 |
| Toluene | 1.65E-02 | 7.21E-02 |
| Trimethylpentane (2,2,4) | 1.01E-02 | 4.44E-02 |
| Xylene | 6.33E-03 | 2.77E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| ***Emission Unit Description*** | | |
|---|---|---|
| **Emission unit ID number:**<br>Tank 258 | **Emission unit name:**<br>Tank 258 | **List any control devices associated with this emission unit:** NA |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):**<br>Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:**<br>Marathon field constructed | **Model number:**<br>Marathon field constructed | **Serial number:**<br>Marathon field constructed |
| **Construction date:**<br>1951 | **Installation date:**<br>1951 | **Modification date(s):**<br>1997 |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 4,397,400 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:**<br>N/A | **Maximum Annual Throughput:**<br>2,044,139,328 gallons | **Maximum Operating Schedule:**<br>8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?**<br>☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:**<br>N/A | | **Type and Btu/hr rating of burners:**<br>N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.**<br>N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| ***Emissions Data*** | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.73 | 7.57 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.56E-02 | 6.81E-02 |
| Ethylbenzene | 1.73E-03 | 7.57E-03 |
| Hexane | 2.77E-02 | 0.12 |
| Toluene | 2.25E-02 | 9.84E-02 |
| Trimethylpentane (2,2,4) | 1.38E-02 | 6.06E-02 |
| Xylene | 8.64E-03 | 3.79E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 257 | **Emission unit name:** Tank 257 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel. | | |
| **Manufacturer:** Marathon field constructed | **Model number:** Marathon field constructed | **Serial number:** Marathon field constructed |
| **Construction date:** 1951 | **Installation date:** 1951 | **Modification date(s):** 1995 |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 4,653,600 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,933,705,872 gallons | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data* (fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 1.46 | 6.40 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 1.3E-02 | 5.8E-02 |
| Ethylbenzene | 1.5E-03 | 6.4E-03 |
| Hexane | 2.3E-02 | 1.0E-01 |
| Toluene | 1.9E-02 | 8.3E-02 |
| Trimethylpentane (2,2,4) | 1.2E-02 | 5.1E-02 |
| Xylene | 7.3E-03 | 3.2E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**
TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 256 | **Emission unit name:** Tank 256 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** External floating roof storage tank containing wastewater with petroleum liquid waste (petroleum wastewater). | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1949 | **Installation date:** 1949 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2,280,600 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,436,400 gallons | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |
| **Describe each fuel expected to be used during the term of the permit.** | | |

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.41 | 1.8 |

| Hazardous Air Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Benzene | 3.72E-03 | 1.63E-02 |
| Ethylbenzene | 4.13E-04 | 1.81E-03 |
| Hexane | 6.61E-03 | 2.89E-02 |
| Toluene | 5.37E-03 | 2.35E-02 |
| Trimethylpentane (2,2,4) | 3.3E-03 | 1.45E-02 |
| Xylene | 2.06E-03 | 9.04E-03 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

No owner or operator of a petroleum storage vessel with an external floating roof shall store petroleum liquid in that tank unless:

a. The tank has been fitted with a continuous secondary seal extending from the floating roof to the tank wall (rim-mounted secondary seal); or a closure or other device that controls VOC emissions with an effectiveness equal to or greater than a seal and is approved by the Director and the U.S. EPA; and
b. All seal closure devices must meet the following requirements: there are no visible holes, tears, or other openings in the seal(s) or seal fabric; the seal(s) are intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall; For vapor-mounted primary seals, the accumulated area of gaps exceeding 0.32 centimeters (cm) (0.125 inches [in]) in width between the secondary seal and the tank wall shall not exceed 21.2 square centimeters per meter ($cm^2/m$) (1.0 square inches per foot [$in^2/ft$]) of tank diameter; and
c. All openings in the external floating roof, except for automatic bleeder vents, rim space vents, and leg sleeves, are: Equipped with covers, seals, or lids in the closed position except when the openings are in actual use; Equipped with projections into the tank that remain below the liquid surface at all times; and
d. Automatic bleeder vents are closed at all times except when the roof is being floated off or being landed on the roof leg supports;
e. Rim vents are set to open when the roof is being floated off the leg supports or at the manufacturer's recommended setting; and
f. Emergency roof drains are provided with slotted membrane fabric covers or equivalent covers which cover

at least 90 percent of the area of the opening.
**[45CSR§21-27.3 *(Tank 256—wastewater and offspec petroleum liquid layer)*]**

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

**Monitoring Requirements**
The owner or operator of a petroleum liquid storage tank with an external floating roof shall perform routine inspections semiannually (the inspections shall include a visual inspection of the secondary seal gap); and measure the secondary seal gap annually when the floating roof is equipped with a vapor molded primary seal.
**[45CSR§21-27.4 *(Tank 256 – wastewater with offspec petroleum liquid layer)*]**

Compliance with inspection requirements shall be determined by physically measuring the length and width of all gaps around the entire circumference of the secondary seal in each place where a 0.32 cm (0.125 inch) uniform diameter probe passes freely (without forcing or binding against the seal) between the seal and tank wall; and summing the area of the individual gaps.
**[45CSR§21-27.6 *(Tank 256 – wastewater with offspec petroleum liquid layer)*]**

**Recordkeeping Requirements**
The owner or operator of any petroleum liquid storage tank with a fixed roof or external floating roof shall maintain the following records in a readily accessible location for at least five (5) years and shall make copies of the records available to the Director upon verbal or written request:
1. Records of the types of petroleum liquids stored;
2. Records of the maximum true vapor pressure of the liquid as stored; and
3. Records of the results of the inspections performed.

**[45CSR§21-27.5 *(Tank 256 – wastewater with offspec petroleum liquid layer)*]**

**Reporting Requirements**
The owner or operator of any facility containing sources subject to 45CSR21-27 and 28 shall comply with excess emission reporting requirements.
**[45CSR§21-27.7 *(Tank 256 – wastewater with offspec petroleum liquid layer)*]**

The owner or operator shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:

a. The name and location of the facility;
b. The subject sources that caused the excess emissions;
c. The time and date of first observation of the excess emissions; and
d. The cause and expected duration of the excess emissions.
e. For sources subject to numerical emission limitations, the estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and
f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions.

**[45CSR§21-5.2. *(Tank 256 – wastewater with offspec petroleum liquid layer)*]**

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | |
|---|---|---|
| **Emission unit ID number:** Tank 255 | **Emission unit name:** Tank 255 | **List any control devices associated with this emission unit:** N/A |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Vertical fixed cone roof storage tank containing distillate fuel (Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A |
| **Construction date:** 1948 | **Installation date:** 1948 | **Modification date(s):** N/A |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 5,527,200 gallons (shell capacity from OIS 2014) | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 1,140,014,736 gallons | **Maximum Operating Schedule:** 8,760 hours |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | |

**Describe each fuel expected to be used during the term of the permit.**

| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |

***Emissions Data***

| Criteria Pollutants | Potential Emissions | |
|---|---|---|
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |
| Sulfur Dioxide ($SO_2$) | N/A | N/A |

| | | |
|---|---|---|
| Volatile Organic Compounds (VOC) | 1.13 | 4.93 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 2.3E-04 | 9.9E-04 |
| Ethylbenzene | 4.5E-04 | 2.0E-03 |
| Hexane | 1.1E-04 | 4.9E-04 |
| Toluene | 2.9E-03 | 1.3E-02 |
| Trimethylpentane (2,2,4) | N/A | N/A |
| Xylene | 7.8E-03 | 3.4E-02 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on the material with the highest vapor pressure which is kerosene. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

N/A

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**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

N/A

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# ATTACHMENT E - Emission Unit Form

| *Emission Unit Description* | | | |
|---|---|---|---|
| **Emission unit ID number:** Tank 253 | **Emission unit name:** Tank 253 | **List any control devices associated with this emission unit:** N/A | |
| **Provide a description of the emission unit (type, method of operation, design parameters, etc.):** Internal floating roof storage tank containing gasoline / distillate (Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Products described as distillate may include fuel oil #2, kerosene, and jet A fuel.) | | | |
| **Manufacturer:** N/A | **Model number:** N/A | **Serial number:** N/A | |
| **Construction date:** 1948 | **Installation date:** 1948 | **Modification date(s):** 1992 | |
| **Design Capacity (examples: furnaces - tons/hr, tanks - gallons):** 2,444,400 gallons (shell capacity from OIS 2014) | | | |
| **Maximum Hourly Throughput:** N/A | **Maximum Annual Throughput:** 790,172,460 gallons | **Maximum Operating Schedule:** 8,760 hours | |
| ***Fuel Usage Data*** **(fill out all applicable fields)** | | | |
| **Does this emission unit combust fuel?** ☐ Yes ☒ No | | **If yes, is it?** ☐ Indirect Fired ☐ Direct Fired | |
| **Maximum design heat input and/or maximum horsepower rating:** N/A | | **Type and Btu/hr rating of burners:** N/A | |
| **List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.** N/A | | | |
| **Describe each fuel expected to be used during the term of the permit.** | | | |
| Fuel Type | Max. Sulfur Content | Max. Ash Content | BTU Value |
| N/A | | | |
| | | | |
| | | | |

| *Emissions Data* | | |
|---|---|---|
| Criteria Pollutants | Potential Emissions | |
| | PPH | TPY |
| Carbon Monoxide (CO) | N/A | N/A |
| Nitrogen Oxides ($NO_X$) | N/A | N/A |
| Lead (Pb) | N/A | N/A |
| Particulate Matter ($PM_{2.5}$) | N/A | N/A |
| Particulate Matter ($PM_{10}$) | N/A | N/A |
| Total Particulate Matter (TSP) | N/A | N/A |

| | | |
|---|---|---|
| Sulfur Dioxide ($SO_2$) | N/A | N/A |
| Volatile Organic Compounds (VOC) | 0.39 | 1.73 |
| Hazardous Air Pollutants | Potential Emissions | |
| | PPH | TPY |
| Benzene | 3.5E-03 | 1.6E-02 |
| Ethylbenzene | 3.9E-04 | 1.7E-03 |
| Hexane | 6.3E-03 | 2.8E-02 |
| Toluene | 5.1E-03 | 2.2E-02 |
| Trimethylpentane (2,2,4) | 3.2E-03 | 1.4E-02 |
| Xylene | 2.0E-03 | 8.6E-03 |
| Regulated Pollutants other than Criteria and HAP | Potential Emissions | |
| | PPH | TPY |
| | | |

**List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).**

TanksESP® storage tank calculation software version 5.01, which uses the 11/2006 version of EPA's AP-42 Chapter 7 equations. Emissions estimates are based on gasoline and account for the seasonal RVP variations. The maximum throughput is assumed to be six (6) times the maximum throughput realized between 2010-2013. Hourly emissions are estimated by dividing the annual emissions by 8,760 hr/yr. Note that given the unique and infrequent nature of these emissions and the established historical precedent, cleaning and landing loss emissions were not included in the potential emissions for each individual tank. Cleaning and landing loss emissions are reflected in the facility-wide potential to emit in Attachment I.

***Applicable Requirements***

**List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

Please refer to Table E-2. Applicable Requirements for IFR Tanks.

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

**Table E-2. Applicable Requirements for EUs 253, 257, 258, 259, 260, 264, 265, 266, 267, 268, 270, 271, & 272**

| *Applicable Requirements* | |
|---|---|
| **List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.** | |
| **Citation** | **Citation Requirement** |
| 40 CFR 60.112b(a)(1)-(2) | The owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 5.2 kPa but less than 76.6 kPa or with a design capacity greater than or equal to 75 m3 but less than 151 m3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa, shall equip each storage vessel with one of the following:<br><br>a. A fixed roof in combination with an internal floating roof meeting the following specifications:<br><br>1. The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.2. Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:<br><br>i. A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal). A liquid mounted seal means a foam- or liquid-filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the tank.<br><br>ii. Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both must be continuous.<br><br>iii. A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.<br><br>3. Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and the rim space vents is to provide a projection below the liquid surface.<br><br>4. Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.<br><br>5. Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. |

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| | 6. Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.<br><br>7. Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90 percent of the opening.<br><br>8. Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.<br><br>9. Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.<br><br>b. An external floating roof, defined as a pontoon-type or double-deck type cover that rests on the liquid surface in a vessel with no fixed roof, which meets the following specifications:<br><br>1. Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge. The closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal, and the upper seal is referred to as the secondary seal. The primary seal shall be either a mechanical shoe seal or a liquid-mounted seal. Except as provided in Section 4.2.4.b.4 of Permit R30-09900022-2015, the seal shall completely cover the annular space between the edge of the floating roof and tank wall. The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in Section 4.2.4.b.4 of Permit R30-09900022-2015.<br><br>2. Except for automatic bleeder vents and rim space vents, each opening in a noncontact external floating roof shall provide a projection below the liquid surface. Except for automatic bleeder vents, rim space vents, roof drains, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal, or lid that is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof legs supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90 percent of the area of the opening.<br><br>3. The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the tank is completely emptied and subsequently refilled. The process of filling, emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. |
| 40 CFR 60.114b | NSPS Kb - Alternative means of emission limitation.<br><br>(a) If, in the Administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions at least equivalent to the reduction in emissions achieved by any requirement in §60.112b, the Administrator will publish in the Federal Register a notice permitting the use of the alternative means for purposes of compliance with that requirement.<br><br>(b) Any notice under paragraph (a) of this section will be published only after notice and an opportunity for a hearing.<br><br>(c) Any person seeking permission under this section shall submit to the Administrator a written application including:<br><br>(1) An actual emissions test that uses a full-sized or scale-model storage vessel that accurately collects and measures all VOC emissions from a given control device and that |

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| | accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.<br><br>(2) An engineering evaluation that the Administrator determines is an accurate method of determining equivalence.<br><br>(d) The Administrator may condition the permission on requirements that may be necessary to ensure operation and maintenance to achieve the same emissions reduction as specified in §60.112b. |
| 45CSR21-28.3 | No owner or operator of a petroleum liquid storage tank with a fixed roof shall store petroleum liquid in that tank unless:<br><br>a. The tank is equipped with an internal floating roof equipped with a closure seal or seals to close the space between the roof edge and tank wall; or an equally effective alternative control, approved by the Director and the U.S. EPA.<br><br>b. The tank is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials; and<br><br>c. All openings, except stub drains, are equipped with covers, lids, or seals such that the cover, lid, or seal is in the closed position at all times except when in actual use; automatic bleeder vents are closed at all times except when the roof is being floated off or being landed on the roof leg supports; and rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting. |
| 40 CFR 63.423(a) | a. Each owner or operator of a bulk gasoline terminal shall equip each gasoline storage vessel with a design capacity greater than or equal to 75 m3 according to the requirements in Section 4.1.5 of this permit, except for the requirements in Sections 4.1.5.a.4 through 9 and Section 4.1.5.a.2.ii of Permit R30-09900022-2015.<br><br>b. Each owner or operator shall equip each external floating roof gasoline storage vessel with a design capacity greater than or equal to 75 m3 according to the requirements in Section 4.1.5.b.2 of Permit R30-09900022-2015 if such storage vessel does not currently meet the requirements in paragraph a. of this section. |

__X__ Permit Shield

**For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)**

| **Citation** | **Citation Requirement** |
|---|---|
| 40 CFR 60.113b(a)(5) | NSPS Kb - Reporting and Recordkeeping Requirements<br>The owner or operator shall notify the Director and USEPA in writing at least 30 days prior to the filling or refilling of each storage vessel for which an inspection is required by Section 4.2.4.a.1. and 4.2.4.a.4. of Permit R30-09900022-2015 to afford the Director and USEPA the opportunity to have an observer present. If the inspection required by Section 4.2.4.a.4. of Permit R30-09900022-2015 is not planned and the owner or operator could not have known about the inspection 30 days in advance or refilling the tank, the owner or operator shall notify the Director and USEPA at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the Director and USEPA at least 7 days prior to the refilling. |
| 40 CFR 60.116b(b)-(c) | The permittee shall keep readily accessible records showing the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel for the life of the source. In addition, the permittee shall maintain a record of the VOL stored, the period of storage, and |

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| 40 CFR 63.427(c) | the maximum true vapor pressure of that VOL during the respective storage period. These records shall be maintained for a period of no less than five (5) years. |
| 40 CFR 60.113b | NSPS Kb - Testing and Procedures<br>For all the inspections required by 40 CFR 60.113b(b)(6), the owner or operator shall notify the Administrator in writing at least 30 days prior to the filling or refilling of each storage vessel to afford the Administrator the opportunity to inspect the storage vessel prior to refilling. If the inspection required by paragraph b.6. of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Administrator at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the Administrator at least 7 days prior to the refilling. |
| 45CSR21-28.4 | The owner or operator of a petroleum liquid storage tank with a fixed roof shall perform routine, semi-annual, visual inspections of the internal floating roof and its closure seal or seals through roof hatches; and perform a complete inspection of cover and seal whenever the tank is emptied for non-operational reasons or at least every<br>5 years, whichever is more frequent. |
| 45CSR21-28.5 | The owner or operator of any petroleum liquid storage tank with a fixed roof or external floating roof shall maintain the following records in a readily accessible location for at least five (5) years and shall make copies of the records available to the Director upon verbal or written request:<br>1. Records of the types of petroleum liquids stored;<br>2. Records of the maximum true vapor pressure of the liquid as stored; and<br>3. Records of the results of the inspections performed in accordance with sections 4.2.1. and 4.2.3. of Permit R30-09900022-2015. |
| 45CSR21-28.6 & 21-5.2 | The owner or operator of any facility containing sources subject to 45CSR21-27 and 28 shall comply with the requirements in section 4.5.2 of Permit R30-09900022-2015.<br>The owner or operator shall, for each occurrence of excess emissions expected to last more than 7 days, within 1 business day of becoming aware of such occurrence, supply the Director by letter with the following information:<br>a. The name and location of the facility;<br>b. The subject sources that caused the excess emissions;<br>c. The time and date of first observation of the excess emissions; and<br>d. The cause and expected duration of the excess emissions.<br>e. For sources subject to numerical emission limitations, the estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and<br>f. The proposed corrective actions and schedule to correct the conditions causing the excess emissions. |
| 40 CFR 63.425(d) & 427(c) | The owner or operator of each storage vessel as specified in Section 4.1.5. of Permit R30-09900022-2015 shall meet the requirements of this section. The applicable paragraph for a particular storage vessel depends on the control equipment installed to meet the requirements of Section 4.1.5. of Permit R30-09900022-2015.<br>a.<br>1. Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the storage vessel with VOL. If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal |

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| | floating roof, or both, the owner or operator shall repair the items before filling the storage vessel.<br><br>2. For vessels equipped with a liquid-mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the storage vessel from service within 45 days. If a failure that is detected during inspections required in this paragraph cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the Administrator in the inspection report required in Section 4.5.4.a.3 of Permit R30-09900022-2015. Such a request for an extension must document that alternate storage capacity is unavailable and specify a schedule of actions the company will take that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.<br><br>3. For vessels equipped with a double-seal system as specified in Section 4.1.5.a.2.ii. of Permit R30-09900022-2015:<br><br>i. Visually inspect the vessel as specified in paragraph 4 of this section at least every 5 years; or<br><br>ii. Visually inspect the vessel as specified in paragraph 2 of this section.<br><br>4. Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes and sleeve seals (if any) each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10 percent open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with VOL.<br><br>b. After installing the control equipment required to meet Section 4.1.5.b. (external floating roof) of Permit R30-09900022-2015, the owner or operator shall:<br><br>1. Determine the gap areas and maximum gap widths, between the primary seal and the wall of the storage vessel and between the secondary seal and the wall of the storage vessel according to the following frequency.<br><br>i. Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the vessel or within 60 days of the initial fill with VOL and at least once every 5 years thereafter.<br><br>ii. Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.<br><br>iii. If any source ceases to store VOL for a period of 1 year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of paragraphs b.1.i. and b.1.ii. above.<br><br>2. Determine gap widths and areas in the primary and secondary seals individually by the following procedures:<br><br>i. Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.<br><br>ii. Measure seal gaps around the entire circumference of the tank in each place where a 0.32-cm diameter uniform probe passes freely (without forcing or binding against seal) between |

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| | the seal and the wall of the storage vessel and measure the circumferential distance of each such location.<br><br>iii. The total surface area of each gap described in paragraph b.2.ii of this section shall be determined by using probes of various widths to measure accurately the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.<br><br>3. Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the respective standards in paragraph b.4 of this section.<br><br>4. Make necessary repairs or empty the storage vessel within 45 days of identification in any inspection for seals not meeting the requirements listed in b.4.i. and ii. of this section:<br>i. The accumulated area of gaps between the tank wall and the mechanical shoe or liquid-mounted primary seal shall not exceed 212 cm2 per meter of tank diameter, and the width of any portion of any gap shall not exceed 3.81 cm. One end of the mechanical shoe is to extend into the stored liquid, and the other end is to extend a minimum vertical distance of 61 cm above the stored liquid surface. There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.<br><br>ii. The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in paragraph b.2.iii. of this section. The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm2 per meter of tank diameter, and the width of any portion of any gap shall not exceed 1.27 cm. There are to be no holes, tears, or other openings in the secondary seal or seal fabric.<br><br>iii. If a failure that is detected during inspections required in Section 4.2.4.b.1 of Permit R30-09900022-2015 cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the Administrator in the inspection report required in Section 4.5.4.b.4 of Permit R30-09900022-2015. Such extension request must include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.<br><br>5. Notify the Administrator 30 days in advance of any gap measurements required by paragraph b.1. of this section to afford the Administrator the opportunity to have an observer present.<br><br>6. Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.<br><br>i. If the external floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the storage vessel with VOL. |
| 40 CFR 63.427(c) | Each owner or operator of gasoline storage vessels subject to the provisions of §63.423 shall comply with the monitoring requirements in §60.116b of this chapter, except records shall be kept for at least 5 years. If a closed vent system and control device are used, as specified in §60.112b(a)(3) of this chapter, to comply with the requirements in §63.423, the owner or operator shall also comply with the requirements in paragraph (a) of 40 CFR 63.427. |
| 40 CFR 60.116b(d) | The owner or operator of each storage vessel meeting the specifications of Section 4.1.5. of Permit R30-09900022-2015 shall notify the Administrator within thirty (30) days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range. |

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| | Except as provided in 40 CFR 60.116b(g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m3 storing a liquid with a maximum true vapor pressure that is normally less than 5.2 kPa or with a design capacity greater than or equal to 75 m 3 but less than 151 m3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa shall notify the Administrator within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range. |
| 40 CFR 60.115b; 40 CFR 63.428(d) | The owner or operator of each storage vessel as specified in Section 4.1.5 of Permit R30-09900022-2015 shall keep records and furnish reports as required by this section depending upon the control equipment installed to meet the requirements of 40 CFR 60 Subpart Kb. The owner or operator shall keep copies of all reports and records required by this section for at least 5 years.<br><br>a. After installing control equipment in accordance with Section 4.1.5.a of Permit R30-09900022-2015, the owner or operator shall meet the following requirements.<br><br>1. Furnish the Administrator with a report that describes the control equipment and certifies that the control equipment meets the specifications of Sections 4.1.5.a. and 4.2.4.a.1. of Permit R30-09900022-2015. This report shall be an attachment to the notification required by 40 CFR 60.7(a)(3).<br><br>2. Keep a record of each inspection performed as required by Section 4.2.4.a.1., 4.2.4.a.2., 4.2.4.a.3., and 4.2.4.a.4. of Permit R30-09900022-2015. Each record shall identify the storage vessel on which the inspection was performed and shall contain the date the vessel was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).<br><br>3. If any of the conditions described in Section 4.2.4.a.2. of Permit R30-09900022-2015 are detected during the annual required visual inspection, a report shall be furnished to the Administrator within 30 days of the inspection. Each report shall identify the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made.<br><br>4. After each inspection required by Section 4.2.4.a.3. of Permit R30-09900022-2015 that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in Section 4.2.4.a.3.ii. of this permit, a report shall be furnished to the Administrator within 30 days of the inspection. The report shall identify the storage vessel and the reason it did not meet the specifications of Sections 4.1.5.a. or 4.2.4.a.3. of Permit R30-09900022-2015 and list each repair made.<br><br>b. After installing control equipment in accordance with Section 4.1.5.b. (external floating roof) of Permit R30-09900022-2015, the owner or operator shall meet the following requirements.<br><br>1. Furnish the Administrator with a report that describes the control equipment and certifies that the control equipment meets the specifications of Sections 4.1.5.b. and 4.2.4.b.2., 3., and 4. of Permit R30-09900022-2015. This report shall be an attachment to the notification required by 40 C.F.R. §60.7(a)(3).<br><br>2. Within 60 days of performing the seal gap measurements required by Section 4.2.4.b.1. of Permit R30-09900022-2015 , furnish the Administrator with a report that contains the date of measurement, the raw data obtained in the measurement, and the calculations described in Section 4.2.4.b.2. and 3. of Permit R30-09900022-2015 .<br><br>3. Keep a record of each gap measurement performed as required by Section 4.2.4.b. of Permit R30-09900022-2015. Each record shall identify the storage vessel in which the measurement was performed and shall contain the date of measurement, the raw data obtained in the measurement, and the calculations described in Section 4.2.4.b.2. and 3. of Permit R30-09900022-2015. |

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| | 4. After each seal gap measurement that detects gaps exceeding the limitations specified by Section 4.2.4.b.4. of Permit R30-09900022-2015, submit a report to the Administrator within 30 days of the inspection. The report will identify the vessel and contain the information specified in paragraph b.2. of this section and the date the vessel was emptied or the repairs made and date of repair. |

**Are you in compliance with all applicable requirements for this emission unit?** ☒ Yes ☐ No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

# APPENDIX F - WVDEP TITLE V SCHEDULE OF COMPLIANCE FORMS

This application form is required if a facility indicated noncompliance with any of the applicable requirements identified in the permit application. If the facility is in compliance with the applicable requirements this form is not required and as such has not been included in this appendix.

# APPENDIX G – WVDEP TITLE V CONTROL DEVICE FORMS

# ATTACHMENT G - Air Pollution Control Device Form

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| **Control device ID number:** 0001 | **List all emission units associated with this control device.** Barge Loading, dockside arrival and departure gauging/sampling emissions | |
| **Manufacturer:** John Zink | **Model number:** HAM54001650101085B | **Installation date:** 03/01/1999 |

**Type of Air Pollution Control Device:**

___ Baghouse/Fabric Filter ___ Venturi Scrubber ___ Multiclone

_X_ Carbon Bed Adsorber ___ Packed Tower Scrubber ___ Single Cyclone

___ Carbon Drum(s) ___ Other Wet Scrubber ___ Cyclone Bank

___ Catalytic Incinerator ___ Condenser ___ Settling Chamber

___ Thermal Incinerator ___ Flare ___ Other (describe) ________________

___ Wet Plate Electrostatic Precipitator ___ Dry Plate Electrostatic Precipitator

**List the pollutants for which this device is intended to control and the capture and control efficiencies.**

| Pollutant | Capture Efficiency | Control Efficiency |
|---|---|---|
| Volatile Organic Compounds | 100% | 97+% |
| | | |
| | | |
| | | |

**Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).**

Pressure Drop: minimum = 2.0 inches $H_2O$, average = 5.0 inches $H_2O$, and maximum = 14.0 inches $H_2O$
Inlet Gas Flow: average = 750 $ft^3$/min and maximum = 1,520 $ft^3$/min
Inlet Gas Temperatures: average = 80 deg. F and maximum = 180 deg. F
Outlet Gas Flow: 750 $ft^3$/min and maximum = 1,520 $ft^3$/min
Outlet Gas Temperatures: average = 100 deg. F and maximum = 180 deg. F

**Is this device subject to the CAM requirements of 40 C.F.R. 64?** ___ Yes _X_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

Barge loading is subject to a MACT Y, which requires that MPLXT reduce captured HAP emissions from marine tank vessel loading operations by 97 weight-percent.

CAM requirements do not apply to MACT emission limits promulgated after November 15, 1990. Because the only applicable emission limit to barge loading is established in MACT Y, which was promulgated September 19, 1995, the 97 weight-percent limit is not subject to the requirements of CAM.

Loading operations are additionally subject to the reasonably available control technology (RACT) standards established in 40 CFR 63.562(c). Specifically, MPLXT must also reduce captured VOC emissions by 95 weight-percent per 40 CFR 63.562(c)(3).

Because the VRU CEMS operates on a continuous basis and provides data which directly correlate with the compliance limit, the CEMS meets the two (2) criteria required to constitute a continuous compliance determination method as defined in 40 CFR 64.1. Therefore, the RACT limit is also exempt from the requirements of CAM in accordance with 40 CFR 64.2(b)(1)(vi).

Additionally, MPLXT is requesting an operational restriction per 45CSR30-12.7 to require the capture and control of dock arrival emissions using the existing VRU. The VRU is subject and complies with MACT Y control requirements, but MACT Y does not apply to the dock arrival depressurization emissions. Thus, MPLXT is not using a control device to comply with a federally enforceable emission limit.

Refer to Section 2.5 of the attached application narrative for additional details.

**Describe the parameters monitored and/or methods used to indicate performance of this control device.**

A stack test was conducted on June 1, 2011. The Gasoline Terminal Air Emission Source Test was conducted in accordance with procedures established and the test methods referenced in 40 CFR 63, Subpart Y which specifically included: Method 2, Method 2A, Method 25B, Method 21, and 40 CFR 63.565(b)(3).

MPLXT operates a continuous emissions monitoring system (CEMS) to monitor the outlet VOC concentration at the outlet of each of the carbon absorber units.

# APPENDIX H – COMPLIANCE ASSURANCE MONITORING (CAM) FORM

As detailed in Section 2 of the application report, CAM does not apply to the Kenova-TriState Terminal emission units (as detailed on the form included in this Appendix).

# ATTACHMENT H - Compliance Assurance Monitoring (CAM) Plan Form

For definitions and information about the CAM rule, please refer to 40 CFR Part 64. Additional information (including guidance documents) may also be found at http://www.epa.gov/ttn/emc/cam.html

***CAM APPLICABILITY DETERMINATION***

1) Does the facility have a PSEU (Pollutant-Specific Emissions Unit considered separately with respect to **EACH** regulated air pollutant) that is subject to CAM (40 CFR Part 64), which must be addressed in this CAM plan submittal? To determine applicability, a PSEU must meet **all** of the following criteria (*If No, then the remainder of this form need not be completed*):

☐ YES ☒ NO

a. The PSEU is located at a major source that is required to obtain a Title V permit;

b. The PSEU is subject to an emission limitation or standard for the applicable regulated air pollutant that is NOT exempt;

LIST OF EXEMPT EMISSION LIMITATIONS OR STANDARDS:

- NSPS (40 CFR Part 60) or NESHAP (40 CFR Parts 61 and 63) proposed after 11/15/1990.
- Stratospheric Ozone Protection Requirements.
- Acid Rain Program Requirements.
- Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR §64.1.
- An emission cap that meets the requirements specified in 40 CFR §70.4(b)(12).

c. The PSEU uses an add-on control device (as defined in 40 CFR §64.1) to achieve compliance with an emission limitation or standard;

d. The PSEU has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than the Title V Major Source Threshold Levels; AND

e. The PSEU is NOT an exempt backup utility power emissions unit that is municipally-owned.

***BASIS OF CAM SUBMITTAL***

2) Mark the appropriate box below as to why this CAM plan is being submitted as part of an application for a Title V permit:

☐ RENEWAL APPLICATION. **ALL** PSEUs for which a CAM plan has NOT yet been approved need to be addressed in this CAM plan submittal.

☐ INITIAL APPLICATION (submitted after 4/20/98). **ONLY** large PSEUs (i. e., PSEUs with potential post-control device emissions of an applicable regulated air pollutant that are equal to or greater than Major Source Threshold Levels) need to be addressed in this CAM plan submittal.

☐ SIGNIFICANT MODIFICATION TO LARGE PSEUs. **ONLY** large PSEUs being modified after 4/20/98 need to be addressed in this cam plan submittal. For large PSEUs with an approved CAM plan, Only address the appropriate monitoring requirements affected by the significant modification.

| ***3) [a] BACKGROUND DATA AND INFORMATION*** | | | | | |
|---|---|---|---|---|---|
| Complete the following table for **all** PSEUs that need to be addressed in this CAM plan submittal. This section is to be used to provide background data and information for each PSEU In order to supplement the submittal requirements specified in 40 CFR §64.4. If additional space is needed, attach and label accordingly. | | | | | |
| PSEU DESIGNATION | DESCRIPTION | POLLUTANT | CONTROL DEVICE | [b] EMISSION LIMITATION or STANDARD | [c] MONITORING REQUIREMENT |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| <u>EXAMPLE</u> Boiler No. 1 | Wood-Fired Boiler | PM | Multiclone | 45CSR§2-4.1.c.; 9.0 lb/hr | Monitor pressure drop across multiclone: Weekly inspection of multiclone |

[a] If a control device is common to more than one PSEU, one monitoring plan may be submitted for the control device with the affected PSEUs identified and any conditions that must be maintained or monitored in accordance with 40 CFR §64.3(a). If a single PSEU is controlled by more than one control device similar in design and operation, one monitoring plan for the applicable control devices may be submitted with the applicable control devices identified and any conditions that must be maintained or monitored in accordance with 40 CFR §64.3(a).

[b] Indicate the emission limitation or standard for any applicable requirement that constitutes an emission limitation, emission standard, or standard of performance (as defined in 40 CFR §64.1).

[c] Indicate the monitoring requirements for the PSEU that are required by an applicable regulation or permit condition.

| *CAM MONITORING APPROACH CRITERIA* | | | |
|---|---|---|---|
| Complete this section for **EACH** PSEU that needs to be addressed in this CAM plan submittal. This section may be copied as needed for each PSEU. This section is to be used to provide monitoring data and information for EACH indicator selected for EACH PSEU in order to meet the monitoring design criteria specified in 40 CFR §64.3 and §64.4. if more than two indicators are being selected for a PSEU or if additional space is needed, attach and label accordingly with the appropriate PSEU designation, pollutant, and indicator numbers. | | | |
| **4a) PSEU Designation:** | **4b) Pollutant:** | **4c) [a] Indicator No. 1:** | **4d) [a] Indicator No. 2:** |
| **5a) GENERAL CRITERIA** Describe the MONITORING APPROACH used to measure the indicators: | | | |
| [b] Establish the appropriate INDICATOR RANGE or the procedures for establishing the indicator range which provides a reasonable assurance of compliance: | | | |
| **5b) PERFORMANCE CRITERIA** Provide the SPECIFICATIONS FOR OBTAINING REPRESENTATIVE DATA, such as detector location, installation specifications, and minimum acceptable accuracy: | | | |
| [c] For new or modified monitoring equipment, provide VERIFICATION PROCEDURES, including manufacturer's recommendations, TO CONFIRM THE OPERATIONAL STATUS of the monitoring: | | | |
| Provide QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) PRACTICES that are adequate to ensure the continuing validity of the data, (i.e., daily calibrations, visual inspections, routine maintenance, RATA, etc.): | | | |
| [d] Provide the MONITORING FREQUENCY: | | | |
| Provide the DATA COLLECTION PROCEDURES that will be used: | | | |
| Provide the DATA AVERAGING PERIOD for the purpose of determining whether an excursion or exceedance has occurred: | | | |

[a] Describe all indicators to be monitored which satisfies 40 CFR §64.3(a). Indicators of emission control performance for the control device and associated capture system may include measured or predicted emissions (including visible emissions or opacity), process and control device operating parameters that affect control device (and capture system) efficiency or emission rates, or recorded findings of inspection and maintenance activities.

[b] Indicator Ranges may be based on a single maximum or minimum value or at multiple levels that are relevant to distinctly different operating conditions, expressed as a function of process variables, expressed as maintaining the applicable indicator in a particular operational status or designated condition, or established as interdependent between more than one indicator. For CEMS, COMS, or PEMS, include the most recent certification test for the monitor.

[c] The verification for operational status should include procedures for installation, calibration, and operation of the monitoring equipment, conducted in accordance with the manufacturer's recommendations, necessary to confirm the monitoring equipment is operational prior to the commencement of the required monitoring.

[d] Emission units with post-control PTE ≥ 100 percent of the amount classifying the source as a major source (i.e., Large PSEU) must collect four or more values per hour to be averaged. A reduced data collection frequency may be approved in limited circumstances. Other emission units must collect data at least once per 24 hour period.

## *RATIONALE AND JUSTIFICATION*

Complete this section for **EACH** PSEU that needs to be addressed in this CAM plan submittal. This section may be copied as needed for each PSEU. This section is to be used to provide rationale and justification for the selection of EACH indicator and monitoring approach and EACH indicator range in order to meet the submittal requirements specified in 40 CFR §64.4.

| 6a) PSEU Designation: | 6b) Regulated Air Pollutant: |
|---|---|
| | |

7) **INDICATORS AND THE MONITORING APPROACH**: Provide the rationale and justification for the selection of the indicators and the monitoring approach used to measure the indicators. Also provide any data supporting the rationale and justification. Explain the reasons for any differences between the verification of operational status or the quality assurance and control practices proposed, and the manufacturer's recommendations. (If additional space is needed, attach and label accordingly with the appropriate PSEU designation and pollutant):

8) **INDICATOR RANGES**: Provide the rationale and justification for the selection of the indicator ranges. The rationale and justification shall indicate how **EACH** indicator range was selected by either a COMPLIANCE OR PERFORMANCE TEST, a TEST PLAN AND SCHEDULE, or by ENGINEERING ASSESSMENTS. Depending on which method is being used for each indicator range, include the specific information required below for that specific indicator range. (If additional space is needed, attach and label accordingly with the appropriate PSEU designation and pollutant):

- COMPLIANCE OR PERFORMANCE TEST (Indicator ranges determined from control device operating parameter data obtained during a compliance or performance test conducted under regulatory specified conditions or under conditions representative of maximum potential emissions under anticipated operating conditions. Such data may be supplemented by engineering assessments and manufacturer's recommendations). The rationale and justification shall INCLUDE a summary of the compliance or performance test results that were used to determine the indicator range, and documentation indicating that no changes have taken place that could result in a significant change in the control system performance or the selected indicator ranges since the compliance or performance test was conducted.

- TEST PLAN AND SCHEDULE (Indicator ranges will be determined from a proposed implementation plan and schedule for installing, testing, and performing any other appropriate activities prior to use of the monitoring). The rationale and justification shall INCLUDE the proposed implementation plan and schedule that will provide for use of the monitoring as expeditiously as practicable after approval of this CAM plan, except that in no case shall the schedule for completing installation and beginning operation of the monitoring exceed 180 days after approval.

- ENGINEERING ASSESSMENTS (Indicator Ranges or the procedures for establishing indicator ranges are determined from engineering assessments and other data, such as manufacturers' design criteria and historical monitoring data, because factors specific to the type of monitoring, control device, or PSEU make compliance or performance testing unnecessary). The rationale and justification shall INCLUDE documentation demonstrating that compliance testing is not required to establish the indicator range.

RATIONALE AND JUSTIFICATION:

# APPENDIX I - SITE-WIDE EMISSION CALCULATIONS

## Potential Emissions Summary: Kenova-TriState Terminal

| EU ID | Description/ Product Stored | Tank Type | Capacity[d] (gallons) | Install Date | Potential Emissions (tpy) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | VOC | $PM_{FILT}$ | $PM_{10}$ | $PM_{2.5}$ | $NO_X$ | CO | $SO_2$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ | Max Ind. HAP | HAP (Total) |
| Tank 300 | Additive Storage Tank | VFR | 3,780 | N/A | 1.2E-03 | | | | | | | | | | | | 1.20E-03 |
| Tank 301 | Additive Storage Tank | VFR | 8,400 | N/A | 0.01 | | | | | | | | | | | | 1.47E-03 |
| Tank 202 | Distillate Fuel Storage Tank[a] | VFR | 1,054,200 | 1938 | 0.86 | | | | | | | | | | | 8.59E-05 | 0.01 |
| Tank 253 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 2,444,400 | 1948 (Modified 1992) | 1.73 | | | | | | | | | | | 2.76E-02 | 0.09 |
| Tank 255 | Distillate Fuel Storage Tank[a] | VFR | 5,527,200 | 1948 | 4.93 | | | | | | | | | | | 4.93E-04 | 6.34E-02 |
| Tank 256 | Petroleum Waste Water Storage Tank[b] | EFR | 2,280,600 | 1949 | 1.81 | | | | | | | | | | | 2.89E-02 | 0.09 |
| Tank 257 | Gasoline Storage Tank | IFR | 4,653,600 | 1951 (Modified 2008) | 6.40 | | | | | | | | | | | 0.10 | 0.33 |
| Tank 258 | Gasoline Storage Tank | IFR | 4,397,400 | 1951 (Modified 1997) | 7.57 | | | | | | | | | | | 0.12 | 0.39 |
| Tank 259 | Gasoline Storage Tank | IFR | 4,653,600 | 1951 (Modified 2007) | 5.55 | | | | | | | | | | | 8.88E-02 | 0.29 |
| Tank 260 | Gasoline Storage Tank | IFR | 4,985,400 | 1968 (Modified 2004) | 5.60 | | | | | | | | | | | 8.95E-02 | 0.29 |
| Tank 261 | Distillate Fuel Storage Tank[a] | VFR | 6,631,800 | 1968 (Modified 2003) | 7.62 | | | | | | | | | | | 7.62E-04 | 0.10 |
| Tank 262 | Distillate Fuel Storage Tank[a] | VFR | 6,631,800 | 1971 | 7.71 | | | | | | | | | | | 7.71E-04 | 0.10 |
| Tank 264 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 3,838,800 | 1990 | 2.51 | | | | | | | | | | | 4.01E-02 | 0.13 |
| Tank 265 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 1,377,600 | 1991 | 2.81 | | | | | | | | | | | 4.49E-02 | 0.15 |
| Tank 266 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 1,810,200 | 1993 | 2.73 | | | | | | | | | | | 4.37E-02 | 0.14 |
| Tank 267 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 1,797,600 | 1993 | 2.73 | | | | | | | | | | | 4.37E-02 | 0.14 |
| Tank 268 | Gasoline / Distillate Fuel Storage Tank[c] | IFR | 1,793,400 | 1993 | 2.73 | | | | | | | | | | | 4.37E-02 | 0.14 |
| Tank 270 | Gasoline Storage Tank | IFR | 2,377,200 | 2001 | 4.72 | | | | | | | | | | | 9.00E-02 | 0.30 |
| Tank 271 | Gasoline Storage Tank | IFR | 2,377,200 | 2001 | 4.72 | | | | | | | | | | | 9.00E-02 | 0.30 |
| Tank 272 | Gasoline Storage Tank | IFR | 2,377,200 | 2001 | 4.72 | | | | | | | | | | | 9.00E-02 | 0.30 |
| Tank 273 | Cone Roof Storage Tank (Fixed Roof) - Biodiesel / #2 Diesel | VFR | 957,600 | 2012 | 10.85 | | | | | | | | | | | | 0.01 |
| Tank K2 | Assumed RVP 10 gasoline | HFR | 1,974 | 2007 | 0.76 | | | | | | | | | | | 1.21E-02 | 0.04 |
| Tank K3 | Assumed RVP 10 gasoline | HFR | 1,974 | 2007 | 0.76 | | | | | | | | | | | 1.21E-02 | 0.04 |
| T-M-2 | Transmix | HFR | 4,032 | 2018 | 1.51 | | | | | | | | | | | 2.42E-02 | 0.08 |
| T-M-3 | Transmix | HFR | 4,032 | 2018 | 1.51 | | | | | | | | | | | 2.42E-02 | 0.08 |
| RA-1-302 | Diesel Dye Tank | HFR | 546 | 2018 | 9.8E-04 | | | | | | | | | | | | 9.77E-04 |
| Landing/Cleaning Losses | [Floating Roof Tanks] | N/A | N/A | N/A | 30.73 | | | | | | | | | | | 0.49 | 1.60 |
| Oily Sewer System | Assumed RVP 10 gasoline | N/A | N/A | N/A | 24.26 | | | | | | | | | | | 0.88 | 3.25 |
| Gasoline Filter Change-outs | | N/A | N/A | N/A | 4.9E-03 | | | | | | | | | | | 7.80E-05 | 2.54E-04 |
| Barge Loading | Gasoline[e] | N/A | N/A | N/A | 179.4 | | | | | | | | | | | 2.87 | 9.34 |
| Dock Arrival & Dock Departure Gauging/Sampling Emissions | | N/A | N/A | N/A | 427.25 | | | | | | | | | | | 6.84 | 22.26 |
| Fugitive Equipment Leaks - LL/GV (Gasoline/Distillate Service) | | N/A | N/A | N/A | 1.00 | | | | | | | | | | | 1.59E-02 | 0.05 |
| Fugitive Equipment Leaks - HL (Gasoline/Distillate Service) | | | | | 0.84 | | | | | | | | | | | 8.39E-05 | 0.01 |
| Fugitive Equipment Leaks -Butane Service | | N/A | N/A | N/A | 0.05 | | | | | | | | | | | | |
| Fugitive Equipment Leaks - Butane Hose Disconnects | | N/A | N/A | 2019 | 5.5E-04 | | | | | | | | | | | | |
| Hot Oil Heater for Tank 273 | | N/A | 2.499 MMBtu/hr | 2011 | 0.06 | 0.02 | 0.08 | 0.08 | 1.07 | 0.90 | 0.01 | 1280.39 | 0.02 | 2.41E-03 | 1281.71 | 1.93E-02 | 0.02 |
| Loaded Fleet Fire Pump Engine | | N/A | N/A | 2015 | 0.91 | 0.03 | | | 0.91 | 0.18 | 1.39E-03 | 20.79 | 5.90E-03 | 1.18E-03 | 21.29 | | 3.46E-03 |
| Lift Station Backup Pump | | N/A | N/A | 2018 | 1.07 | 2.13E-02 | | | 2.26 | 2.96 | 3.13E-03 | 328.50 | 1.33E-02 | 2.66E-03 | 329.63 | | 3.39E-04 |
| Diesel Fueling Station | | N/A | N/A | N/A | 0.33 | | | | | | | | | | | 3.29E-05 | 4.22E-03 |
| Roadway Emissions | | N/A | N/A | N/A | | 0.15 | 0.03 | 0.01 | | | | | | | | | |
| Cooling Tower | | N/A | N/A | N/A | | 0.01 | 0.01 | 1.40E-02 | | | | | | | | | |
| Pressurized Butane Bullets | | N/A | N/A | 2019 | | | | | | | | | | | | | |
| | | | | **Total Emissions:** | **758.7** | **0.2** | **0.1** | **0.1** | **4.2** | **4.0** | **0.01** | **1,629.7** | **0.04** | **0.01** | **1,632.6** | **12.1** | **40.2** |

[a] Products described as distillate may include fuel oil #2, kerosene, and jet A fuel. Emissions estimates are based on the material with the highest vapor pressure which is kerosene.

[b] Worst-case material properties of the wastewater assume a gasoline layer exists on top of the stored liquid.

[c] Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Emissions estimates are based on storage of gasoline RVP 9 from October - March, RVP 13.5 during April and September, and RVP 15 from May - August.

[d] Tank volume provided is the working volume.

[d] Worst-case annual emissions occur when assuming 100% of all barges are loaded with gasoline. MPLXT may also load barges with distillate.

## Facility-Wide HAP Calculations

HAP EMISSIONS FACTORS[a]

**Arithmetic Average HAP to VOC Ratio (Percent by Weight)**

| HAP | Gasoline | Diesel |
|---|---|---|
| Hexane | 1.60% | 0.01% |
| Benzene | 0.90% | 0.02% |
| Cumene | 0.01% | 0.01% |
| Toluene | 1.30% | 0.26% |
| 2,2,4-Trimethylpentane | 0.80% | 0.00% |
| Xylene | 0.50% | 0.69% |
| Naphthalene | - | 0.255% |
| Ethylbenzene | 0.10% | 0.04% |

[a]Potential gasoline HAP emissions are based on the factors provided in the Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards Draft Report (Table 3.1). Cumene data is taken from SDS. Diesel factors calculated using data from the Karin Ritter (API) memo to the Gasoline Distribution MACT Workgroup dated 2/8/95 containing speciation data submitted by various API member companies.

POTENTIAL HAP EMISSIONS CALCULATIONS[b]

| EU ID | Description | Material Stored/Loaded[e] | VOC (tpy) | Hexane (tpy) | Benzene (tpy) | Cumene (tpy) | Toluene (tpy) | 2,2,4-Trimethylpentane (tpy) | Xylene (tpy) | Naphthalene (tpy) | Ethylbenzene (tpy) | Total HAPs[c] (tpy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tank 300 | Additive Storage Tank | Distillate Additives/Dyes | 1.20E-03 | - | - | - | - | - | 9.36E-04 | - | 2.61E-04 | 1.20E-03 |
| Tank 301 | Additive Storage Tank | Lubricity Additive | 7.21E-03 | - | - | 3.35E-04 | - | - | 1.13E-03 | - | - | 1.47E-03 |
| Tank 202 | Distillate Fuel Storage Tank | Distillate | 0.9 | 8.59E-05 | 1.72E-04 | 8.59E-05 | 2.23E-03 | - | 5.93E-03 | 2.19E-03 | 3.44E-04 | 1.10E-02 |
| Tank 253 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 1.7 | 2.76E-02 | 1.55E-02 | 1.73E-04 | 2.24E-02 | 1.38E-02 | 8.63E-03 | - | 1.73E-03 | 8.99E-02 |
| Tank 255 | Distillate Fuel Storage Tank | Distillate | 4.9 | 4.93E-04 | 9.86E-04 | 4.93E-04 | 1.28E-02 | - | 3.40E-02 | 1.26E-02 | 1.97E-03 | 6.34E-02 |
| Tank 256 | Petroleum Waste Water Storage Tank | Wastewater | 1.8 | 2.89E-02 | 1.63E-02 | 1.81E-04 | 2.35E-02 | 1.45E-02 | 9.04E-03 | - | 1.81E-03 | 9.42E-02 |
| Tank 257 | Gasoline Storage Tank | Gasoline | 6.4 | 0.10 | 5.76E-02 | 6.40E-04 | 8.33E-02 | 5.12E-02 | 3.20E-02 | - | 6.40E-03 | 0.33 |
| Tank 258 | Gasoline Storage Tank | Gasoline | 7.6 | 0.12 | 6.81E-02 | 7.57E-04 | 9.84E-02 | 6.06E-02 | 3.79E-02 | - | 7.57E-03 | 0.39 |
| Tank 259 | Gasoline Storage Tank | Gasoline | 5.5 | 8.88E-02 | 4.99E-02 | 5.55E-04 | 7.21E-02 | 4.44E-02 | 2.77E-02 | - | 5.55E-03 | 0.29 |
| Tank 260 | Gasoline Storage Tank | Gasoline | 5.6 | 8.95E-02 | 5.04E-02 | 5.60E-04 | 7.27E-02 | 4.48E-02 | 2.80E-02 | - | 5.60E-03 | 0.29 |
| Tank 261 | Distillate Fuel Storage Tank | Distillate | 7.6 | 7.62E-04 | 1.52E-03 | 7.62E-04 | 1.98E-02 | - | 5.26E-02 | 1.94E-02 | 3.05E-03 | 9.79E-02 |
| Tank 262 | Distillate Fuel Storage Tank | Distillate | 7.7 | 7.71E-04 | 1.54E-03 | 7.71E-04 | 2.00E-02 | - | 5.32E-02 | 1.97E-02 | 3.08E-03 | 9.91E-02 |
| Tank 264 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 2.5 | 4.01E-02 | 2.26E-02 | 2.51E-04 | 3.26E-02 | 2.01E-02 | 1.25E-02 | - | 2.51E-03 | 0.13 |
| Tank 265 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 2.8 | 4.49E-02 | 2.53E-02 | 2.81E-04 | 3.65E-02 | 2.25E-02 | 1.40E-02 | - | 2.81E-03 | 0.15 |
| Tank 266 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 2.7 | 4.37E-02 | 2.46E-02 | 2.73E-04 | 3.55E-02 | 2.18E-02 | 1.36E-02 | - | 2.73E-03 | 0.14 |
| Tank 267 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 2.7 | 4.37E-02 | 2.46E-02 | 2.73E-04 | 3.55E-02 | 2.18E-02 | 1.36E-02 | - | 2.73E-03 | 0.14 |
| Tank 268 | Gasoline / Distillate Fuel Storage Tank | Gasoline | 2.7 | 4.37E-02 | 2.46E-02 | 2.73E-04 | 3.55E-02 | 2.18E-02 | 1.36E-02 | - | 2.73E-03 | 0.14 |
| Tank 270 | Gasoline Storage Tank[f] | Gasoline | 4.7 | 9.00E-02 | 5.00E-02 | 4.72E-04 | 7.00E-02 | 5.00E-02 | 3.00E-02 | - | 1.00E-02 | 0.30 |
| Tank 271 | Gasoline Storage Tank[f] | Gasoline | 4.7 | 9.00E-02 | 5.00E-02 | 4.72E-04 | 7.00E-02 | 5.00E-02 | 3.00E-02 | - | 1.00E-02 | 0.30 |
| Tank 272 | Gasoline Storage Tank[f] | Gasoline | 4.7 | 9.00E-02 | 5.00E-02 | 4.72E-04 | 7.00E-02 | 5.00E-02 | 3.00E-02 | - | 1.00E-02 | 0.30 |
| Tank 273 | Cone Roof Biodiesel Storage Tank | Biodiesel | 10.9 | - | - | - | - | - | - | 0.01 | - | 0.01 |
| Tank K2 | Assumed RVP 10 gasoline | Gasoline | 0.76 | 1.21E-02 | 6.81E-03 | 7.57E-05 | 9.84E-03 | 6.06E-03 | 3.78E-03 | - | 7.57E-04 | 3.94E-02 |
| Tank K3 | Assumed RVP 10 gasoline | Gasoline | 0.76 | 1.21E-02 | 6.81E-03 | 7.57E-05 | 9.84E-03 | 6.06E-03 | 3.78E-03 | - | 7.57E-04 | 3.94E-02 |
| T-M-2 | Transmix | Gasoline | 1.51 | 2.42E-02 | 1.36E-02 | 1.51E-04 | 1.97E-02 | 1.21E-02 | 7.57E-03 | - | 1.51E-03 | 7.89E-02 |
| T-M-3 | Transmix | Gasoline | 1.51 | 2.42E-02 | 1.36E-02 | 1.51E-04 | 1.97E-02 | 1.21E-02 | 7.57E-03 | - | 1.51E-03 | 7.89E-02 |
| RA-1-302 | Diesel Dye Tank | Distillate Additives/Dyes | 9.77E-04 | - | - | | - | - | 7.64E-04 | - | 2.13E-04 | 9.77E-04 |

POTENTIAL HAP EMISSIONS CALCULATIONS[b]

| EU ID | Description | Material Stored/Loaded[e] | VOC (tpy) | Hexane (tpy) | Benzene (tpy) | Cumene (tpy) | Toluene (tpy) | 2,2,4-Trimethylpentane (tpy) | Xylene (tpy) | Naphthalene (tpy) | Ethylbenzene (tpy) | Total HAPs[c] (tpy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Landing/Cleaning Losses | | Gasoline | 30.73 | 0.49 | 0.28 | 3.07E-03 | 0.40 | 0.25 | 0.15 | 0.00 | 0.03 | 1.60 |
| Oily Sewer System | | See Wastewater Calculations | 24.26 | 0.88 | 0.18 | 0.08 | 0.61 | 0.64 | 0.66 | 0.04 | 0.17 | 3.25 |
| Gasoline Filter Change-outs | | Gasoline | 4.88E-03 | 7.80E-05 | 4.39E-05 | 4.88E-07 | 6.34E-05 | 3.90E-05 | 2.44E-05 | - | 4.88E-06 | 2.54E-04 |
| Hot Oil Heater for Tank 273 | | See Hot Oil Heater Calculations | 0.1 | 1.93E-02 | 2.25E-05 | - | 3.65E-05 | - | - | 6.55E-06 | - | 2.03E-02 |
| Loaded Fleet Fire Pump Engine | | See Engine Calculations | 0.9 | - | 8.33E-04 | - | 3.65E-04 | - | 2.54E-04 | 7.57E-05 | - | 3.46E-03 |
| Lift Station Backup Pump | | See Engine Calculations | 1.07 | - | 1.88E-03 | - | 8.24E-04 | - | 5.74E-04 | 1.71E-04 | - | 3.39E-04 |
| Diesel Fueling Station | | NA | 0.3 | 3.29E-05 | 6.57E-05 | 3.29E-05 | 8.54E-04 | - | 2.27E-03 | 8.38E-04 | 1.31E-04 | 4.22E-03 |
| Roadway Emissions | | NA | - | - | - | - | - | - | - | - | - | - |
| Cooling Tower | | NA | - | - | - | - | - | - | - | - | - | - |
| Barge Loading | | Gasoline[g] | 179.4 | 2.87 | 1.61 | 0.02 | 2.33 | 1.43 | 0.90 | - | 0.18 | 9.34 |
| Dock Arrival & Dock Departure Gauging/Sampling Emissions | | Gasoline[g] | 427.25 | 6.84 | 3.85 | 0.04 | 5.55 | 3.42 | 2.14 | - | 0.43 | 22.26 |
| Fugitive Equipment Leaks - LL/GV (Gasoline/Distillate Service) | | Gasoline[d] | 1.00 | 1.59E-02 | 8.96E-03 | 9.96E-05 | 1.29E-02 | 7.97E-03 | 4.98E-03 | - | 9.96E-04 | 5.19E-02 |
| Fugitive Equipment Leaks - HL (Gasoline/Distillate Service) | | Distillate[d] | 0.84 | 8.39E-05 | 1.68E-04 | 8.39E-05 | 2.18E-03 | - | 5.79E-03 | 2.14E-03 | 3.36E-04 | 0.01 |
| Fugitive Equipment Leaks - Butane Hose Disconnects | | Butane | 5.53E-04 | | | | | | | | | |
| Fugitive Equipment Leaks - Butane Service | | Butane | 0.05 | | | | | | | | | |
| Pressurized Butane | | Butane | 0.00 | | | | | | | | | |
| | | **Total Emissions** | **758.7** | **12.1** | **6.5** | **0.1** | **9.8** | **6.3** | **4.3** | **0.1** | **0.9** | **40.2** |

Maximum Individual HAP Emissions

| Emissions | Hexane (tpy) |
|---|---|
| Maximum Individual HAP | 12.1 |

[b] Individual HAP Emission (tpy) = Individual HAP to VOC Ratio (Percent by Weight) * VOC (tpy), with the exception of engines, heater, and oily sewer system.

[c] Note that these calculations conservatively assume that total HAP is equal to the sum of the individual HAP shown (with the exception of engines, heater, and oily sewer system)

[d] Assumes that HAP concentration in VOC emissions from Piping Components is consistent with the worst-case product being transmitted via the relevant pipes.

[e] Calculations assume 'distillate' refers to diesel, kerosene, jet fuel, and distillate additives.

[f] HAP emissions for Tanks 270-272 and taken from R13-2277C, with the exception of cumene. HAP emissions from Tank 273 are taken from R13-2277

[g] HAP emissions from loading gasoline and from dockside emissions determined for barges containing gasoline represent the worst-case annual HAP emissions as compared to distillate-related HAP emissions.

**Storage Tank Potential Emissions**

| EU ID | Description/ Product Stored [a] | Product Modeled [a,b,c] | Diameter (ft) | Height (ft) or Length (ft) for HRT | Capacity[d] (gallons) | Max Throughput[e] (gal/yr) | VOC R13 Permit Limit (lb/yr) | AP-42 Calculated Annual Emissions[f] (lb/yr) | VOC Potential Emissions (lbs/yr)[g] | VOC Potential Emissions (tpy) | VOC R13 Permit Limit (lb/hr) | Calculated Annual Average VOC Emissions (lb/hr)[h] | VOC Potential Emissions (lbs/hr)[g] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tank 300 | Additive Storage Tank | Unisol® Liquid Red BK-50 | 5.25 | 24 | 3,780 | 66,138 | | 2 | 2 | 1.20E-03 | | 2.73E-04 | 2.73E-04 |
| Tank 301 | Additive Storage Tank | HiTEC® 4142M Fuel Additive | 8 | 21.33 | 8,400 | 39,150 | | 14 | 14 | 7.21E-03 | | 1.65E-03 | 1.65E-03 |
| Tank 202 | Distillate Fuel Storage Tank | Jet Kerosene | 65.83 | 41.42 | 1,054,200 | 181,091,988 | | 1,718 | 1,718 | 0.86 | | 0.20 | 0.20 |
| Tank 253 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 90 | 51.33 | 2,444,400 | 790,172,460 | | 3,453 | 3,453 | 1.73 | | 0.39 | 0.39 |
| Tank 255 | Distillate Fuel Storage Tank | Jet Kerosene | 140 | 48 | 5,527,200 | 1,140,014,736 | | 9,862 | 9,862 | 4.93 | | 1.13 | 1.13 |
| Tank 256 | Petroleum Waste Water Storage Tank | Gasoline (Seasonal RVP) | 90 | 47.92 | 2,280,600 | 1,436,400 | | 3,617 | 3,617 | 1.81 | | 0.41 | 0.41 |
| Tank 257 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 120 | 55 | 4,653,600 | 1,933,705,872 | | 12,808 | 12,808 | 6.40 | | 1.46 | 1.46 |
| Tank 258 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 120 | 52 | 4,397,400 | 2,044,139,328 | | 15,143 | 15,143 | 7.57 | | 1.73 | 1.73 |
| Tank 259 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 120 | 55 | 4,653,600 | 1,864,196,964 | | 11,095 | 11,095 | 5.55 | | 1.27 | 1.27 |
| Tank 260 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 120 | 58.92 | 4,985,400 | 1,821,252,132 | | 11,191 | 11,191 | 5.60 | | 1.28 | 1.28 |
| Tank 261 | Distillate Fuel Storage Tank | Jet Kerosene | 150 | 50.17 | 6,631,800 | 2,170,264,874 | | 15,235 | 15,235 | 7.62 | | 1.74 | 1.74 |
| Tank 262 | Distillate Fuel Storage Tank | Jet Kerosene | 150 | 50.17 | 6,631,800 | 2,213,571,528 | | 15,418 | 15,418 | 7.71 | | 1.76 | 1.76 |
| Tank 264 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 110 | 54 | 3,838,800 | 886,692,240 | | 5,019 | 5,019 | 2.51 | | 0.57 | 0.57 |
| Tank 265 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 70 | 47.83 | 1,377,600 | 1,134,000,000 | 5,614 | 5,018 | 5,614 | 2.81 | 0.64 | 0.64 | 0.64 |
| Tank 266 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 80 | 48.17 | 1,810,200 | 1,134,000,000 | 5,457 | 4,489 | 5,457 | 2.73 | 0.63 | 0.62 | 0.63 |
| Tank 267 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 80 | 47.83 | 1,797,600 | 1,134,000,000 | 5,457 | 4,660 | 5,457 | 2.73 | 0.63 | 0.62 | 0.63 |
| Tank 268 | Gasoline / Distillate Fuel Storage Tank | Gasoline (Seasonal RVP) | 80 | 47.67 | 1,793,400 | 1,134,000,000 | 5,457 | 4,509 | 5,457 | 2.73 | 0.63 | 0.62 | 0.63 |
| Tank 270 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 85 | 56 | 2,377,200 | 1,533,000,017 | 9,432 | 9,128 | 9,432 | 4.72 | | 1.08 | 1.08 |
| Tank 271 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 85 | 56 | 2,377,200 | 1,533,000,017 | 9,432 | 9,172 | 9,432 | 4.72 | | 1.08 | 1.08 |
| Tank 272 | Gasoline Storage Tank | Gasoline (Seasonal RVP) | 85 | 56 | 2,377,200 | 1,533,000,017 | 9,432 | 9,171 | 9,432 | 4.72 | | 1.08 | 1.08 |
| Tank K2 | Oily Wastewater (Assumed RVP 10 Gasoline) | Gasoline RVP 10 | 5.33 | 12 | 1,974 | 731,056 | | 1,514 | 1,514 | 0.76 | | 0.17 | 0.17 |
| Tank K3 | Oily Wastewater (Assumed RVP 10 Gasoline) | Gasoline RVP 10 | 5.33 | 12 | 1,974 | 731,056 | | 1,514 | 1,514 | 0.76 | | 0.17 | 0.17 |
| Tank 273 | Biodiesel B-100 Storage Tank | B100 Virgin Soybean Oil | 54 | 56 | 957,600 | 65,167,019 | 21,700 | 21,106 | 21,700 | 10.85 | 64 | 2.48 | 64 |
| T-M-2 | Transmix | Gasoline RVP 10 | 5.33 | 24 | 4,032 | 1,462,110 | | 3,028 | 3,028 | 1.51 | | 0.35 | 0.35 |
| T-M-3 | Transmix | Gasoline RVP 10 | 5.33 | 24 | 4,032 | 1,462,110 | | 3,028 | 3,028 | 1.51 | | 0.35 | 0.35 |
| RA-1-302 | Diesel Dye Tank | Unisol® Liquid Red BK-50 | 4 | 6 | 546 | 393,176 | | 2 | 2 | 9.77E-04 | | 2.23E-04 | 2.23E-04 |
| | | | | | | | **Total:** | **180,913** | **185,640** | **92.82** | | **21.19** | **82.73** |

[a] Products described as distillate may include fuel oil #2, kerosene, and jet A fuel. Emissions estimates are based on the material with the highest vapor pressure which is kerosene.

[b] Worst-case material properties of the wastewater are to assume a gasoline layer.

[c] Materials stored in the gasoline tanks may include distillate fuel and gasoline products with seasonal RVP variations. Emissions estimates are based on gasoline and account for the seasonal RVP variations.

[d] The capacity provided here refers to the shell capacity (rather than the working volume.)

[e] Maximum throughput is the permitted throughput limit (1,134 million gal/yr for Tanks 265-268 from R13-1352A, 1,533 million gal/yr for Tanks 270-272 from R13-2277C, and 65 million gal/yr for Tank 273 from R13-2277C where applicable; Tanks T-M-2, T-M-3, RA-1-302, K2, and K3 conservatively assume a throughput of one turnover per day. For all other tanks, the maximum throughput is assumed to be six (6) times the maximum throughput realized over the 2010-2013 timeframe.

[f] Emissions estimated using AP-42 Chapter 7.1 (11/06) with TankESP® software.

[g] VOC PTE is determined based on AP-42 emission calculations (if no permit limit exists) or the allowable R13 permit limit.

[h] Annual Average VOC Emissions (lb/hr) calculated as: VOC Potential Emissions (lbs/yr) / 8,760 (hr/yr)

**Dimensional Analysis/Process Parameters**

| | | |
|---|---|---|
| Mass Conversion | 2,000 | lb/ton |
| **Gasoline Storage Schedule** | | |
| April/September | RVP 13.5 | |
| October-March | RVP 15 | |
| May-August | RVP 9 | |

## Tank Landing & Cleaning Potential Emissions[a]

| EPA EUID | Tank 253 | Tank 256 | Tank 257 |
|---|---|---|---|
| Tank Number | 51-253 | WA-49-256 | 96-257 |
| Tank Type | IFR | EFR | IFR |
| Diameter, ft | 90 | 90 | 120 |
| Tank Paint Color | White | White | White |
| Terminal | Kenova, WV | Kenova, WV | Kenova, WV |
| Month of Landing Episode | September | September | September |
| Number of Roof Landings per year | 1 | 1 | 1 |
| Deck Leg Height (ft) | 6.03 | 7.25 | 6.50 |
| Full or Partial Heel | Full | Full | Full |
| Original Stored Liquid | Gasoline (RVP 13.5) | Gasoline (RVP 10) | Gasoline (RVP 13.5) |
| Hours Idle Prior to Cleaning | 24.00 | 24.00 | 24.00 |
| Was Tank Cleaned? | Yes | Yes | Yes |
| Breathing Losses (lb/yr) | 723.35 | 477.05 | 1,386.18 |
| Cleaning Losses (lbs/yr) | 2,169.57 | 1,932.02 | 4,157.64 |
| Filling Losses (lbs/yr) | 542.39 | 500.62 | 1,039.41 |
| Total Emissions (lbs/yr) | 3,435.31 | 2,909.70 | 6,583.23 |

[a] Landing loss emissions (breathing and filling Losses) were estimated using the methodology in AP-42 Section 7.1.3.1 (11/06). Cleaning emissions are estimated by assuming the volume of the landed, empty tank is saturated with gasoline vapors, and that the entire volume is released.

Total sum of emissions conservatively assumes all tanks are landed/cleaned in a single year, which has an extremely low probability of occurring.

## Tank Landing & Cleaning Potential Emissions[a]

| EPA EUID | Tank 258 | Tank 259 | Tank 260 | Tank 264 |
|---|---|---|---|---|
| **Tank Number** | 96-258 | 96-259 | 96-260 | 72-264 |
| **Tank Type** | IFR | IFR | IFR | IFR |
| **Diameter, ft** | 120 | 120 | 120 | 110 |
| **Tank Paint Color** | White | White | White | White |
| **Terminal** | Kenova, WV | Kenova, WV | Kenova, WV | Kenova, WV |
| **Month of Landing Episode** | September | September | September | September |
| **Number of Roof Landings per year** | 1 | 1 | 1 | 1 |
| **Deck Leg Height (ft)** | 6.50 | 6.50 | 6.50 | 7.50 |
| **Full or Partial Heel** | Full | Full | Full | Full |
| **Original Stored Liquid** | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) |
| **Hours Idle Prior to Cleaning** | 24.00 | 24.00 | 24.00 | 24.00 |
| **Was Tank Cleaned?** | Yes | Yes | Yes | Yes |
| **Breathing Losses (lb/yr)** | 1,386.18 | 1,386.18 | 1,386.18 | 1,343.97 |
| **Cleaning Losses (lbs/yr)** | 4,157.64 | 4,157.64 | 4,157.64 | 4,031.05 |
| **Filling Losses (lbs/yr)** | 1,039.41 | 1,039.41 | 1,039.41 | 1,007.76 |
| **Total Emissions (lbs/yr)** | 6,583.23 | 6,583.23 | 6,583.23 | 6,382.78 |

[a] Landing loss emissions (breathing and filling Losses) were estimated using the methodology in AP-42 Section 7.1.3.1 (11/06). Cleaning emissions are estimated by assuming the volume of the landed, empty tank is saturated with gasoline vapors, and that the entire volume is released.

Total sum of emissions conservatively assumes all tanks are landed/cleaned in a single year, which has an extremely low probability of occurring.

## Tank Landing & Cleaning Potential Emissions[a]

| EPA EUID | Tank 265 | Tank 266 | Tank 267 | Tank 268 |
|---|---|---|---|---|
| **Tank Number** | 25-265 | 33-266 | 33-267 | 33-268 |
| **Tank Type** | IFR | IFR | IFR | IFR |
| **Diameter, ft** | 70 | 80 | 80 | 80 |
| **Tank Paint Color** | White | White | White | White |
| **Terminal** | Kenova, WV | Kenova, WV | Kenova, WV | Kenova, WV |
| **Month of Landing Episode** | September | September | September | September |
| **Number of Roof Landings per year** | 1 | 1 | 1 | 1 |
| **Deck Leg Height (ft)** | 6.83 | 7.50 | 7.50 | 7.50 |
| **Full or Partial Heel** | Full | Full | Full | Full |
| **Original Stored Liquid** | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) |
| **Hours Idle Prior to Cleaning** | 24.00 | 24.00 | 24.00 | 24.00 |
| **Was Tank Cleaned?** | Yes | Yes | Yes | Yes |
| **Breathing Losses (lb/yr)** | 495.63 | 710.86 | 710.86 | 710.86 |
| **Cleaning Losses (lbs/yr)** | 1,486.58 | 2,132.13 | 2,132.13 | 2,132.13 |
| **Filling Losses (lbs/yr)** | 371.64 | 533.03 | 533.03 | 533.03 |
| **Total Emissions (lbs/yr)** | 2,353.86 | 3,376.02 | 3,376.02 | 3,376.02 |

[a] Landing loss emissions (breathing and filling Losses) were estimated using the methodology in AP-42 Section 7.1.3.1 (11/06). Cleaning emissions are estimated by assuming the volume of the landed, empty tank is saturated with gasoline vapors, and that the entire volume is released.

Total sum of emissions conservatively assumes all tanks are landed/cleaned in a single year, which has an extremely low probability of occurring.

## Tank Landing & Cleaning Potential Emissions[a]

| EPA EUID | Tank 270 | Tank 271 | Tank 272 | Total (lb/yr) |
|---|---|---|---|---|
| **Tank Number** | 52-270 | 52-271 | 52-272 | |
| **Tank Type** | IFR | IFR | IFR | |
| **Diameter, ft** | 85 | 85 | 85 | |
| **Tank Paint Color** | White | White | White | |
| **Terminal** | Kenova, WV | Kenova, WV | Kenova, WV | |
| **Month of Landing Episode** | September | September | September | |
| **Number of Roof Landings per year** | 1 | 1 | 1 | |
| **Deck Leg Height (ft)** | 6.50 | 6.50 | 6.50 | |
| **Full or Partial Heel** | Full | Full | Full | |
| **Original Stored Liquid** | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | Gasoline (RVP 13.5) | |
| **Hours Idle Prior to Cleaning** | 24.00 | 24.00 | 24.00 | |
| **Was Tank Cleaned?** | Yes | Yes | Yes | |
| **Breathing Losses (lb/yr)** | 695.50 | 695.50 | 695.50 | 12,803.79 |
| **Cleaning Losses (lbs/yr)** | 2,086.04 | 2,086.04 | 2,086.04 | 38,904.30 |
| **Filling Losses (lbs/yr)** | 521.51 | 521.51 | 521.51 | 9,743.69 |
| **Total Emissions (lbs/yr)** | 3,303.05 | 3,303.05 | 3,303.05 | 61,451.78 |

[a] Landing loss emissions (breathing and filling Losses) were estimated using the methodology in AP-42 Section 7.1.3.1 (11/06). Cleaning emissions are estimated by assuming the volume of the landed, empty tank is saturated with gasoline vapors, and that the entire volume is released.

Total sum of emissions conservatively assumes all tanks are landed/cleaned in a single year, which has an extremely low probability of occurring.

**Marine Barge Loading Potential Emissions**

PROCESS PARAMETERS / DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Maximum Gasoline Loading Rate | 13,600 | bbl/hr | *Loading is hydraulically limited* |
| Maximum Distillate Loading Rate | 12,000 | bbl/hr | *Loading is hydraulically limited* |
| Distillate Loading Rate (for Worst Case Loading) | 6,000 | bbl/hr | *Worst-case loading assumes gasoline is being loaded at capacity, and only 1 loading line can load distillate simultaneously.* |
| Maximum Daily Loading Rate | 8 | barges/day | |
| Gasoline Barge Capacity | 25,000 | bbl/barge | |
| Maximum Annual Operating Schedule | 365 | day/yr | |
| Mass Conversion | 1000 | gal/Mgal | |
| Mass Conversion | 2000 | lb/ton | |
| Volume Conversion | 42 | gal/bbl | |

GASOLINE LOADING

| | | | |
|---|---|---|---|
| Estimated Throughput | 571 | Mgal/hr | *= Maximum Gasoline Loading Capacity (bbl/hr) * 42 (gal/bbl) / 1000 gal/Mgal* |
| Estimated Throughput | 3,066,000 | Mgal/yr | *= Maximum Daily Loading Rate (barge/day) * Barge Capacity (bbl/barge) * 365 (day/yr) * 42 (gal/bbl) / 1000 gal/Mgal* |
| VOC Emission Factor | 3.9 | lbs/Mgal | *Emission Factor for uncleaned barges from AP-42 Section 5.2, Table 5.2-2 (07/2008)* |
| % Capture Efficiency of VRU | 100% | [%] | *Per Preamble to MACT Y (May 13, 1994), which indicates that 100% capture efficiency can be applied when vapor tight vessels are loaded. Also, an assist blower maintains a vacuum of at least 1.5 inches water column during loading.* |
| % Control Efficiency of VRU | 97% | [%] | *40 CFR 63.562(b)(2) - MACT Y* |
| Overall Efficiency of VRU | 97% | [%] | *= % Capture Efficiency * % Control Efficiency* |
| Uncontrolled Emissions | 2,228 | lbs VOC/hr | *= Estimated Throughput (Mgal/hr) * Emission factor (lb/Mgal)* |
| Uncontrolled Emissions | 11,957,400 | lbs VOC/yr | *= Estimated Throughput (Mgal/yr) * Emission factor (lb/Mgal)* |
| Uncontrolled Emissions | 5,979 | tpy | *= Uncontrolled Emissions (lb/yr) / 2000 (lb/ton)* |
| Controlled Emissions | 67 | lbs VOC/hr | *= Throughput (Mgal/hr) * Emission Factor (lb/Mgal) * (1 - Overall Efficiency of VRU)* |
| Controlled Emissions | 358,722 | lbs VOC/yr | *= Throughput (Mgal/yr) * Emission Factor (lb/Mgal) * (1 - Overall Efficiency of VRU)* |
| Estimated Emissions | 179.4 | tpy | *= Controlled Emissions (lb/yr) / 2000 (lb/ton)* |

DISTILLATE LOADING

| | | | |
|---|---|---|---|
| Estimated Throughput | 504 | Mgal/hr | *= Maximum Distillate Loading Rate (bbl/hr) * 42 (gal/bbl) / 1000 gal/Mgal.* |
| Estimated Throughput | 3,066,000 | Mgal/yr | *= Maximum Daily Loading Rate (barge/day) * Barge Capacity (bbl/barge) * 365 (day/yr) * 42 (gal/bbl) / 1000 gal/Mgal* |
| Emission Factor | 0.012 | lbs/Mgal | *Emission Factor for barge loading of distillate #2 from AP-42 Section 5.2, Table 5.2-6 (07/2008)* |
| % Capture Efficiency of VRU | 0% | [%] | *MPC only recovers vapors from gasoline barge loading* |
| % Control Efficiency of VRU | 0% | [%] | *MPC only recovers vapors from gasoline barge loading* |
| Overall Efficiency of VRU | 0% | [%] | *= % Capture Efficiency * % Control Efficiency* |
| Uncontrolled Emissions | 6 | lbs VOC/hr | *= Estimated Throughput (Mgal/hr) * Emission factor (lb/Mgal)* |
| Uncontrolled Emissions | 36,792 | lbs VOC/yr | *= Estimated Throughput (Mgal/yr) * Emission factor (lb/Mgal)* |
| Uncontrolled Emissions | 18.4 | tpy | *= Uncontrolled Emissions (lb/yr) / 2000 (lb/ton)* |
| Controlled Emissions | 6.0 | lbs VOC/hr | *= Throughput (Mgal/hr) * Emission Factor (lb/Mgal) * (1 - Overall Efficiency of VRU)* |
| Controlled Emissions | 36,792 | lbs VOC/yr | *= Throughput (Mgal/yr) * Emission Factor (lbs/Mgal) (1 - Overall Efficiency of VRU)* |
| Estimated Emissions | 18.4 | tpy | *= Controlled Emissions (lb/yr) / 2000 (lb/ton)* |

WORST-CASE LOADING

*Worst-case short term emissions occur when gasoline is loaded at capacity, and the remaining available loading arm is used to load distillate.*
*Worst case annual emissions are assumed to be the maximum of loading 100% gasoline for the year or 100% distillate for the year.*

| | | | |
|---|---|---|---|
| Estimated Gasoline Throughput | 571 | Mgal/hr | *= Gasoline Loading Capacity (bbl/hr) * 42 (gal/bbl) / 1000 gal/Mgal* |
| Estimated Distillate Throughput | 252 | Mgal/hr | *= Distillate Loading Rate (bbl/hr) * 42 (gal/bbl) / 1000 gal/Mgal. Maximum rate when gasoline is loaded at the max rate.* |
| Gasoline VOC Emission Factor | 3.9 | lbs/Mgal | *Emission Factor for uncleaned barges from AP-42 Section 5.2, Table 5.2-2 (07/2008)* |
| Distillate VOC Emission Factor | 0.012 | lbs/Mgal | *Emission Factor for barge loading of distillate #2 from AP-42 Section 5.2, Table 5.2-6 (07/2008)* |
| % Capture Efficiency of VRU (gas loading) | 100% | [%] | *Per Preamble to MACT Y (May 13, 1994), which indicates that 100% capture efficiency can be applied when vapor tight vessels are loaded. Also, an assist blower maintains a vacuum of at least 1.5 inches water column during loading.* |
| % Control Efficiency of VRU (gas loading) | 97% | [%] | *40 CFR 63.562(b)(2) - MACT Y* |
| Overall Efficiency of VRU (gas loading) | 97% | [%] | *= % Capture Efficiency * % Control Efficiency* |
| Uncontrolled Emissions | 2,231 | lbs VOC/hr | *= Estimated Gasoline Throughput (Mgal/hr) * Gasoline Emission factor (lb/Mgal) + Estimated Distillate Throughput (Mgal/hr) * Distillate Emission factor (lb/Mgal)* |
| Controlled Emissions | 69.9 | lbs VOC/hr | *= Gasoline Throughput (Mgal/hr) * Gasoline Emission Factor (lb/Mgal) * (1 - Overall Efficiency of VRU) + Estimated Distillate Throughput (Mgal/hr) * Distillate Emission factor (lb/Mgal)* |

SUMMARY OF MAXIMUM BARGE LOADING EMISSIONS

| | | | |
|---|---|---|---|
| Maximum Hourly VOC Emissions | 69.9 | lb/hr | |
| Maximum Annual VOC Emissions | 179.4 | tpy | *Equal to the maximum of annual emissions from either gasoline barge loading or distillate barge loading.* |

Note: Max annual emissions from gasoline and distillate are not additive, as each annual calculation assumes 100% of all barges loaded per year are loading either gasoline or distillate

## Dockside Barge Arrival and Departure Gauging/Sampling Potential Emissions

### PROCESS PARAMETERS

| | | | |
|---|---|---|---|
| VRU Control Efficiency | 97% | | *40 CFR 63.562(b)(2) - MACT Y* |
| Percent of Barges with Pressure | 56% | | *Measured data during July 2018* |
| Maximum Annual Loading Rate | 73,000,000 | bbl/yr | *Assumes 8 barges/day x 25,000 bbl/barge of either gasoline or distillate.* |
| September Loading | 6,083,333 | bbl | *= Annual Barge Loading Rate (bbl/yr) x (1/12)* |
| May-August (Summer) Loading | 24,333,333 | bbl | *= Annual Barge Loading Rate (bbl/yr) x (4/12)* |
| April Loading | 6,083,333 | bbl | *= Annual Barge Loading Rate (bbl/yr) x (1/12)* |
| October-March (Winter) Loading | 36,500,000 | bbl | *= Annual Barge Loading Rate (bbl/yr) x (6/12)* |

### DIMENSIONAL ANALYSIS

| | | |
|---|---|---|
| Mass Conversion | 2,000 | lb/ton |

### UNCONTROLLED EMISSION FACTORS

*The following emission factors address dockside emissions resulting from activities conducted prior to loading and after loading is complete, including connection of the shore VRU vapor line and from product quality control (PQ) gauging/ sampling. Dockside arrival emissions result when pressure is released from the cargo tank if the cargo tank has a heel from a prior unloading operation. Not all cargo tanks have dockside pressure prior to loading. The emission factors are determined based on the vessel depressurization equations (Eq. 3-18 - 3-20) from the August 2007 EPA document, "Methods for Estimating Air Emissions from Chemical Manufacturing Facilities," Volume II: Chapter 16.*

*Similarly, dockside departure emissions occur after loading is complete and pressure is released from the cargo tank to conduct PQ sampling or gauging of the material loaded. The factor for dockside departure emissions uses the same depressurization equations.*

*Finally, an evaporation factor is included for emissions during sampling based on an estimated product displacement that occurs during sampling. It is conservatively assumed that every barge will need sampled upon arrival and before departure.*

*Each factor is based on worst-case assumptions for barge pressure, ambient temperature, seasonal material loaded/material vapor pressure, vapor space saturation factor, sampling time, etc., derived from a review of actual measured data.*

#### ARRIVAL DEPRESSURIZATION

| Time Period | Gasoline (lb/bbl) | Gasoline (lb/barge) | Distillate (lb/bbl) | Distillate (lb/barge) |
|---|---|---|---|---|
| September | 9.90E-02 | 2,573.57 | 5.48E-05 | 1.42 |
| May-August (Summer) | 5.37E-02 | 1,396.54 | 6.70E-05 | 1.74 |
| April | 6.43E-02 | 1,670.83 | 2.99E-05 | 0.78 |
| October-March (Winter) | 6.74E-02 | 1,753.65 | 3.06E-05 | 0.79 |

#### SAMPLING EVAPORATION-ARRIVAL

| Time Period | Gasoline (lb/bbl) | Gasoline (lb/barge) | Distillate (lb/bbl) | Distillate (lb/barge) |
|---|---|---|---|---|
| September | 3.27E-03 | 85.14 | 1.63E-05 | 0.11 |
| May-August (Summer) | 2.40E-03 | 62.45 | 5.06E-06 | 0.13 |
| April | 2.61E-03 | 67.90 | 2.18E-06 | 0.06 |
| October-March (Winter) | 2.65E-03 | 68.94 | 2.18E-06 | 0.06 |

#### DEPARTURE DEPRESSURIZATION

| Time Period | Gasoline (lb/bbl) | Gasoline (lb/barge) | Distillate (lb/bbl) | Distillate (lb/barge) |
|---|---|---|---|---|
| September | 8.20E-03 | 213.08 | 1.79E-05 | 0.12 |
| May-August (Summer) | 4.42E-03 | 114.90 | 5.47E-06 | 0.14 |
| April | 5.29E-03 | 137.64 | 2.44E-06 | 0.06 |
| October-March (Winter) | 5.56E-03 | 144.50 | 2.49E-06 | 0.06 |

## Dockside Barge Arrival and Departure Gauging/Sampling Potential Emissions

### SAMPLING EVAPORATION-DEPARTURE

| Time Period | Gasoline (lb/bbl) | Gasoline (lb/barge) | Distillate (lb/bbl) | Distillate (lb/barge) |
|---|---|---|---|---|
| September | 3.27E-03 | 85.14 | 1.63E-05 | 0.11 |
| May-August (Summer) | 2.40E-03 | 62.45 | 5.06E-06 | 0.13 |
| April | 2.61E-03 | 67.90 | 2.18E-06 | 0.06 |
| October-March (Winter) | 2.65E-03 | 68.94 | 2.18E-06 | 0.06 |

### UNCONTROLLED SHORT TERM EMISSIONS (lb/barge)

***Uncontrolled Emissions (lb/barge) = Max of Gasoline or Distilate Seasonal Emissions (lb/barge)***

| Time Period | Arrival | Sampling Evaporation - Arrival | Departure Depressurization | Sampling Evaporation - Departure | Total |
|---|---|---|---|---|---|
| September | 0.0 - 2,573.57 | 0.0 - 85.14 | 0.0 - 213.08 | 0.0 - 85.14 | 0.0 - 2,956.93 |
| May-August (Summer) | 0.0 - 1,396.54 | 0.0 - 62.45 | 0.0 - 114.9 | 0.0 - 62.45 | 0.0 - 1,636.34 |
| April | 0.0 - 1,670.83 | 0.0 - 67.9 | 0.0 - 137.64 | 0.0 - 67.9 | 0.0 - 1,944.27 |
| October-March (Winter) | 0.0 - 1,753.65 | 0.0 - 68.94 | 0.0 - 144.5 | 0.0 - 68.94 | 0.0 - 2,036.02 |

### POTENTIAL CONTROLLED SHORT-TERM EMISSIONS (lb/barge)

***Controlled Emissions (lb/barge) = Arrival Emissions (lb/barge) x (1-VRU Control Efficiency) + Uncontrolled Arrival Sampling Evaporation, Departure Depressurization, & Departure Sampling Evaporation Emissions (lb/barge)***

| Time Period | Arrival | Sampling Evaporation - Arrival | Departure Depressurization | Sampling Evaporation - Departure | Total |
|---|---|---|---|---|---|
| September | 0.0 - 77.21 | 0.0 - 85.14 | 0.0 - 213.08 | 0.0 - 85.14 | 0.0 - 460.57 |
| May-August (Summer) | 0.0 - 41.9 | 0.0 - 62.45 | 0.0 - 114.9 | 0.0 - 62.45 | 0.0 - 281.7 |
| April | 0.0 - 50.12 | 0.0 - 67.9 | 0.0 - 137.64 | 0.0 - 67.9 | 0.0 - 323.57 |
| October-March (Winter) | 0.0 - 52.61 | 0.0 - 68.94 | 0.0 - 144.5 | 0.0 - 68.94 | 0.0 - 334.98 |

### UNCONTROLLED ANNUAL EMISSIONS (tpy)

***Uncontrolled Emissions (tpy) = Max of Gasoline or Distilate Seasonal Emission Factor (lb/bbl) x Maximum Seasonal Annual Loading Rate (bbl/yr) / 2000 (lb/ton)***

| Time Period | Arrival[a] | Sampling Evaporation - Arrival | Departure Depressurization | Sampling Evaporation - Departure | Total |
|---|---|---|---|---|---|
| September | 168.60 | 9.96 | 24.93 | 9.96 | 213.45 |
| May-August (Summer) | 365.96 | 29.22 | 53.77 | 29.22 | 478.18 |
| April | 109.46 | 7.94 | 16.10 | 7.94 | 141.45 |
| October-March (Winter) | 689.32 | 48.39 | 101.42 | 48.39 | 887.52 |
| **Total:** | **1,333.3** | **95.5** | **196.2** | **95.5** | **1,720.6** |

[a] *Arrival emissions account for percent of barges that arrive with pressure (i.e., 56%). Arrival emissions do not occur if the barge does not arrive with pressure.*

### Dockside Barge Arrival and Departure Gauging/Sampling Potential Emissions

**CONTROLLED ANNUAL EMISSIONS (tpy)**

***Controlled Emissions (tpy) = Arrival Emissions (tpy) x (1-VRU Control Efficiency) + Uncontrolled Arrival Sampling Evaporation, Departure Depressurization, & Departure Sampling Evaporation Emissions (tpy)***

| Time Period | Arrival | Sampling Evaporation - Arrival | Departure Depressurization | Sampling Evaporation - Departure | Total |
|---|---|---|---|---|---|
| September | 5.06 | 9.96 | 24.93 | 9.96 | 49.91 |
| May-August (Summer) | 10.98 | 29.22 | 53.77 | 29.22 | 123.19 |
| April | 3.28 | 7.94 | 16.10 | 7.94 | 35.27 |
| October-March (Winter) | 20.68 | 48.39 | 101.42 | 48.39 | 218.88 |
| **Total:** | **40.0** | **95.5** | **196.2** | **95.5** | **427.3** |

*Note: Worst-case annual arrival and departure emissions conservatively represent that all barges previously stored gasoline and are loaded by MPLXT with gasoline.*

**Gasoline Filter Changes Potential Emissions**

| | | | |
|---|---|---|---|
| Filter Changeouts per Year[a] | 6 | | |
| Amount of Gasoline per Changeout[a] | 0.50 | gallons | |
| Amount of Gasoline per Year[a] | 3 | gallons | |
| Gasoline Vapor Emitted per Changeout[a] | 50% | | |
| Density of Gasoline[b] | 6.5 | lb/gallon | |
| VOC Emissions per Event | 1.63 | lb VOC/event | *= Volume of Gasoline per Filter Changeout (gal/change) * % of Gasoline Vapor Emitted * Gasoline Density (lb/gal)* |
| VOC Emissions per Year | 9.75 | lb VOC/year | *= Volume of Gasoline per Filter Changeout (gal/change) * Annual no. of Changeouts (changes/yr) * % of Gasoline Vapor Emitted * Gasoline Density (lb/gal)* |
| VOC Emissions per Year | 0.005 | tons VOC/year | *= VOC Emissions (lb/yr) / 2000 (lb/ton)* |

[a] *Estimates based on conservative engineering judgement*

[b] *American Petroleum Institute (API), Alcohols and Ethers, Table B-1. Publication 4261, June 2001.*

**Diesel Fueling Station Potential Emissions**

DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Time Conversion | 365 | day/yr | |
| Mass Conversion | 2,000 | lb/ton | *NIST SP1038* |

POTENTIAL PROCESS DATA

| | | | |
|---|---|---|---|
| Boats Filled per Day | 3 | boats/day | *The frequency of fueling operations is estimated to be 3 boats per day at a maximum MPC personnel* |
| Volume of Boat Fuel Tanks | 20,000 | gal/boat | *The volume of the fuel tanks is estimated be between 4,000 and 20,000 gallons by MPC personnel* |
| No. 2 Diesel Throughput | 60,000 | gal/day | *No. 2 Diesel Throughput (gal/day) = Boats Filled Per Day (boats/day) * Volume of Boat Fuel Tanks (gal/boat)* |
| No. 2 Diesel Throughput | 21,900 | $10^3$ gal/yr | *No. 2 Diesel Throughput ($10^3$ gal/yr) = No. 2 Diesel Throughput (gal/day) * 365 (day/yr) / 1,000 (gal/$10^3$ gal)* |

EMISSION FACTORS AND OPERATING PARAMETERS

| | | | |
|---|---|---|---|
| VOC Emission Factor | 0.030 | lbs/$10^3$ gal | *The distillate emissions factor was obtained from AP-42 Chapter 5, Table 5.2.5 splash loading emissions factors. There are no AP-42 emission factors available for diesel fuel tank filling, only gasoline.* |

POTENTIAL EMISSIONS CALCULATIONS

| | | | |
|---|---|---|---|
| VOC Emissions | 0.60 | lbs/boat | *VOC Emissions (lbs/day) = No. 2 Diesel Throughput (gal/boat) * VOC Emission Factor (lbs/$10^3$ gal) / 1,000 (gal/$10^3$ gal)* |
| VOC Emissions | 1.80 | lbs/day | *VOC Emissions (lbs/day) = No. 2 Diesel Throughput (gal/day) * VOC Emission Factor (lbs/$10^3$ gal) / 1,000 (gal/$10^3$ gal)* |
| VOC Emissions | 0.33 | tpy | *VOC Emissions (tpy) = No. 2 Diesel Throughput ($10^3$ gal/yr) * VOC Emissions Factor (lbs/$10^3$ gal) / 2,000 (lbs/ton)* |

## Hot Oil Heater Potential Emissions

### Source Designation:

| | | | |
|---|---|---|---|
| Manufacturer: | HEATEC | | |
| Year Installed | 2011 | | |
| Fuel Used: | Natural Gas | | |
| Higher Heating Value (HHV) (Btu/scf): | 1,050 | Btu/scf | |
| Standard Heating Value (Btu/scf): | 1,020 | Btu/scf | *AP-42 Table 1.4.1, footnote 'a' (basis of emission factors)* |
| Heat Input (MMBtu/hr) | 2.499 | MMBtu/hr | |
| Fuel Consumption (mmscf/hr): | 2.38E-03 | mmscf/hr | |
| Fuel Consumption (mmscf/yr): | 20.85 | mmscf/yr | |
| Potential Annual Hours of Operation (hr/yr): | 8,760 | hr/yr | |

### Dimensional Analysis

| | | |
|---|---|---|
| Mass Conversion (g/lb) | 453.59 | g/lb |
| Mass Conversion (g/kg) | 1,000 | g/kg |

### Emission Factors[a,b,c]

| | | | |
|---|---|---|---|
| $NO_x$ | 100 | lb/MMscf | *Factor for Uncontrolled Small Boilers from AP-42, Section 1.4, Table 1.4-1* |
| CO | 84 | lb/MMscf | *Factor for Uncontrolled Small Boilers from AP-42, Section 1.4, Table 1.4-1* |
| $SO_2$ | 0.6 | lb/MMscf | |
| PM Total | 7.6 | lb/MMscf | |
| PM Condensable | 5.7 | lb/MMscf | |
| $PM_{10}$ (Filterable) | 1.9 | lb/MMscf | |
| $PM_{2.5}$ (Filterable) | 1.9 | lb/MMscf | |
| VOC | 5.5 | lb/MMscf | |
| Hexane | 1.80 | lb/MMscf | |
| Total HAP | 1.89 | lb/MMscf | |
| $CO_2$ | 53.06 | kg/MMBtu | |
| $CH_4$ | 1.0E-03 | kg/MMBtu | |
| $N_2O$ | 1.0E-04 | kg/MMBtu | |
| $CO_2$ (GWP) | 1 | | |
| $CH_4$ (GWP) | 25 | | |
| $N_2O$ (GWP) | 298 | | |

[a] *Criteria pollutant and HAP emission factors from AP-42, Section 1.4, Tables 1.4-2 and 1.4-3, unless otherwise noted.*
[b] *GHG emission factors from 40 CFR 98, Subpart C, Tables C-1 and C-2 for natural gas.*
[c] *Total $CO_2$e emission calculations based on global warming potentials as provided in Table A-1 of Part 98, Subpart A.*

### Potential Emissions Calculations

| Pollutant | Potential Emissions (lb/hr)[d,f] | (tons/yr)[e] |
|---|---|---|
| $NO_x$ | 0.245 | 1.073 |
| CO | 0.206 | 0.901 |
| $SO_2$ | 0.0015 | 0.0064 |
| PM Total | 0.0186 | 0.0816 |
| PM Condensable | 0.014 | 0.061 |
| $PM_{10}$ (Filterable) | 0.005 | 0.020 |
| $PM_{2.5}$ (Filterable) | 0.005 | 0.020 |
| VOC | 0.013 | 0.059 |
| Hexane | 4.41E-03 | 1.93E-02 |
| Total HAP | 4.63E-03 | 2.03E-02 |
| $CO_2$ | 292.326 | 1,280 |
| $CH_4$ | 0.006 | 2.41E-02 |
| $N_2O$ | 0.001 | 2.41E-03 |
| $CO_2$e | 292.6 | 1,282 |

[d] *For non-GHG pollutants: Emission Rate (lb/hr) = Firing Rate (MMBtu/hr) × Emission Factor (lb/mmscf) / Standard Heat Content (Btu/scf)*
[e] *Annual Emissions (tons/yr) = Hourly Emissions (lb/hr) × Operating Hours (hr/yr) × (1 ton/2000 lb).*
[f] *For GHG Pollutants: GHG Emission Rate (lb/hr) = Heat Input (MMBtu/hr) × Emission Factor (kg/MMBtu) × 1,000 (g/kg) / 453.59237 (g/lb) / 2,000 (lb/ton)*

## Hot Oil Heater Potential Emissions

### Hazardous Air Pollutant (HAP) Potential Emissions

| Pollutant | Emission Factor (lb/MMscf)[a] | Potential Emissions (lb/hr)[b] | (tons/yr)[c] |
|---|---|---|---|
| 3-Methylchloranthrene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| 7,12-Dimethylbenz(a)anthracene | 1.60E-05 | 3.92E-08 | 1.72E-07 |
| Acenaphthene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Acenaphthylene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Anthracene | 2.40E-06 | 5.88E-09 | 2.58E-08 |
| Benz(a)anthracene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Benzene | 2.10E-03 | 5.15E-06 | 2.25E-05 |
| Benzo(a)pyrene | 1.20E-06 | 2.94E-09 | 1.29E-08 |
| Benzo(b)fluoranthene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Benzo(g,h,i)perlyene | 1.20E-06 | 2.94E-09 | 1.29E-08 |
| Benzo(k)fluoranthene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Chrysene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Dibenzo(a,h) anthracene | 1.20E-06 | 2.94E-09 | 1.29E-08 |
| Dichlorobenzene | 1.20E-03 | 2.94E-06 | 1.29E-05 |
| Fluoranthene | 3.00E-06 | 7.35E-09 | 3.22E-08 |
| Fluorene | 2.80E-06 | 6.86E-09 | 3.00E-08 |
| Formaldehyde | 7.50E-02 | 1.84E-04 | 8.05E-04 |
| Hexane | 1.80E+00 | 4.41E-03 | 1.93E-02 |
| Indo(1,2,3-cd)pyrene | 1.80E-06 | 4.41E-09 | 1.93E-08 |
| Phenanthrene | 1.70E-05 | 4.17E-08 | 1.82E-07 |
| Pyrene | 5.00E-06 | 1.23E-08 | 5.37E-08 |
| Toluene | 3.40E-03 | 8.33E-06 | 3.65E-05 |
| Arsenic | 2.00E-04 | 4.90E-07 | 2.15E-06 |
| Beryllium | 1.20E-05 | 2.94E-08 | 1.29E-07 |
| Cadmium | 1.10E-03 | 2.70E-06 | 1.18E-05 |
| Chromium | 1.40E-03 | 3.43E-06 | 1.50E-05 |
| Cobalt | 8.40E-05 | 2.06E-07 | 9.01E-07 |
| Lead | 5.00E-04 | 1.23E-06 | 5.37E-06 |
| Manganese | 3.80E-04 | 9.31E-07 | 4.08E-06 |
| Mercury | 2.60E-04 | 6.37E-07 | 2.79E-06 |
| Nickel | 2.10E-03 | 5.15E-06 | 2.25E-05 |
| Selenium | 2.40E-05 | 5.88E-08 | 2.58E-07 |
| 2-Methylnaphthalene | 2.40E-05 | 5.88E-08 | 2.58E-07 |
| Naphthalene | 6.10E-04 | 1.49E-06 | 6.55E-06 |
| **Total HAP** | | **4.63E-03** | **2.03E-02** |

[a] *Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-3 & 1.4-4*

[b] *Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr) × Emission Factor (lb/mmscf) / AP-42 Standard Heat Content (mmscf/MMBtu).*

[c] *Annual Emissions (tons/yr) = Hourly Emissions (lb/hr) × Operating Hours (hr/yr) × (1 ton/2000 lb).*

## Cooling Tower Potential Emissions

PROCESS PARAMETERS

| | | | |
|---|---|---|---|
| Drift Loss | 0.005 | % | *Assumed* |
| Maximum Operating Days of Operation per Year | 365 | days/yr | |
| Maximum Operating Hours | 24 | hr/day | |
| Conversion | 60 | min/hr | |
| Conversion | 2000 | lb/ton | |
| Conversion | 1000 | gal/Mgal | |
| Conversion | 100 | cm/m | |
| Conversion | 1.00E-06 | µmhos/mhos | |
| Density of Water | 8.345 | lb/gal | |
| Total Liquid Drift Loss | 0.417 | lbs drift/Mgal | *Total Liquid Drift Loss (lbs drift/Mgal) = [Drift Loss (gal drift/gal flow) * Density of Water (8.345 lbs drift/gal drift) * (1000 gal flow/Mgal flow)].* |
| Total Dissolved Solids Content | 0.05 | mhos/m | *Cooling water is city water. Maximum of range provided for drinking water in "Water Conductivity" from LENNTECH (http://www.lenntech.com/applications/ultrapure/conductivity/water-conductivity.htm)* |
| Total Dissolved Solids Content | 500 | µmhos/cm | *= TDS Content (mhos/m) / 1E-6 (umhos/mhos) / 100 (cm/m)* |
| Total Dissolved Solids Content | 320 | ppm | *TDS Content (ppm) = TDS Content (umhos/cm) / ($10^3$) * 640. Conversion is based on Equation 16-1 on page 1145 of Wastewater Engineering, Metcalf and Eddy.* |
| $PM_{10}$ Emission Factor | 0.0001 | lbs/Mgal | *$PM_{10}$ Emission Factor (lbs/Mgal) = TDS Content (ppm) / ($10^6$) * Total Liquid Drift Loss (lbs drift/Mgal) per AP-42, Section 13.4.2 (January 1995).* |

EMISSIONS CALCULATIONS

| ***EU Description*** | ***Total Flow Capacity [a] (gpm)*** | ***$PM_{10}$ Emissions [b] (lb/hr)*** | ***$PM_{10}$ Emissions [c] (tpy)*** |
|---|---|---|---|
| MPC Kenova-TriState Cooling Tower | 400 | 3.2E-03 | 0.01 |

[a] *Per manufacturer specifications (BAC U148042801-RH Drawings.pdf)*

[b] *Potential $PM_{10}$ Emissions (lb/hr) = $PM_{10}$ Emission Factor (lb/Mgal) * Total Flow Capacity (gpm) * (60 min/hr) / 1000 (gal/Mgal)*

[c] *Potential $PM_{10}$ Emissions (tpy) = Potential $PM_{10}$ Emissions (lb/hr) * 365 (days/yr) * 24 (hr/day) / 2000 (lb/ton)*

## Loaded Fleet Fire Pump (Tier 3) Engine Potential Emissions

### OPERATING PARAMETERS

| | | | |
|---|---|---|---|
| Fuel Used | Diesel | | |
| Power Output | 510 | hp | |
| Heat Input Capacity | 3.57 | MMBtu/hr | *= Power Output (hp) * 7000 (Btu/(hp-hr)) * 1x10$^{-6}$ MMBtu/Btu* |
| Operating Hours | 500 | hr/yr | *Emergency use only* |
| Estimated Hourly Fuel Usage | 23.50 | Gal/hr | *Per manufacturer specifications for Clarke JX6H-UFAD60 (25JAN12 Data Sheet C132901 Rev E for 510 HP/1760 RPM)* |
| Maximum Annual Fuel Usage | 11,750 | Gal/yr | *= Estimated Hourly Fuel Usage * Operating Hours (500 hrs/yr)* |

### DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Power Conversion | 7,000 | Btu/hp-hr | *per Footnote 'a' to Table 3.3-1 in AP-42 Section 3.3* |
| General Conversion | 1,000,000 | Units/MMUnit | |
| Mass Conversion | 0.4536 | kg/lb | *NIST* |
| Mass Conversion | 1,000 | g/kg | |
| Mass Conversion | 453.592 | g/lb | |
| Mass Conversion | 2,000 | lb/ton | |
| Sulfur Dioxide (SO2), Molecular Weight | 64 | lb/lb-mole | *NIST Chemistry WebBook, SRD 69* |
| Sulfur (S), Molecular Weight | 32 | lb/lb-mole | *NIST Chemistry WebBook, SRD 69* |

### EMISSION FACTOR DEVELOPMENT

| | | | |
|---|---|---|---|
| Diesel Energy Content | 19,300 | Btu/lb | *AP-42 Section 3.3, Table 3.3-1, Footnote 'c'* |
| Not to Exceed Multiplier | 1.25 | | *40 CFR 60.4212(c )* |
| Sulfur Content (Non-Road Diesel Fuel) | 15 | ppm | *40 CFR 60.4207(b) and 40 CFR 80.510(b)* |

## Loaded Fleet Fire Pump (Tier 3) Engine Potential Emissions

### EMISSION FACTORS

| *Pollutant* | *Emission Factor* | *Units* | *Source* |
|---|---|---|---|
| $NO_X$ | 3.25 | g/hp-hr | *Per emissions data for Clarke JX6H-UFAD60 (4APRIL15 Data Sheet for 510 HP/1760 RPM)* |
| CO | 0.63 | g/hp-hr | *Per emissions data for Clarke JX6H-UFAD60 (4APRIL15 Data Sheet for 510 HP/1760 RPM)* |
| $SO_2$ | 0.0055 | lb/hr | *= (Sulfur Content (ppm) x $10^{-6}$ ) x [Heat Input Capacity -(MMBtu/hr) x $10^6$ (btu/MMBtu) / Diesel Energy Content (btu/lb)] x [ 1 lbmole $SO_2$ / 1 lbmole S] x [$SO_2$ M.W./ Sulfur M.W.]* |
| Filterable PM | 0.11 | g/hp-hr | *Per emissions data for Clarke JX6H-UFAD60 (4APRIL15 Data Sheet for 510 HP/1760 RPM)* |
| Condensable PM Factor | 0.0077 | lb/MMBtu | *AP-42, Section 3.4, Table 3.4-2 (10/96)* |
| Filterable PM Factor | 0.062 | lb/MMBtu | *AP-42, Section 3.4, Table 3.4-2 (10/96)* |
| Condensable PM | 0.01 | g/hp-hr | *Condensable emission factor (g/hp-hr) = (Condensable Particulate Emission Factor (lb/MMBtu) / (Filterable Particulate Emission Factor (lb/MMBtu)) * Filterable Emission Factor (g/hp-hr); where the ratio is taken from section AP-42, Section 3.4,Table 3.4-2 (10/96) to account for the absence of condensable factor in mfr specs* |
| Total PM | 0.13 | g/hp-hr | *= Filterable PM/$PM_{10}$ EF (lb/MMBtu) + Condensable PM EF (lb/MMBtu)* |
| TOC | 0.13 | g/hp-hr | *Per emissions data for total hydrocarbons for Clark JX6H-UFAD60 (4APRIL15 Data Sheet for 510 HP/1760 RPM)* |
| $CO_2$ | 73.96 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-1 for Distillate Fuel Oil No. 2* |
| $CH_4$ | 3.00E-03 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-2 for Petroleum* |
| $N_2O$ | 6.00E-04 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-2 for Petroleum* |
| $CO_2$ | 23.29 | lb/MMBtu | *= $CO_2$ EF (g/hp-hr) / 453.6 (g/lb) / 7,000 (Btu/hp-hr) * 1,000,000 (Btu/MMBtu)* |
| $CH_4$ | 6.61E-03 | lb/MMBtu | *= $CH_4$ EF (kg/MMBtu) / 0.4536 (kg/lb)* |
| $N_2O$ | 1.32E-03 | lb/MMBtu | *= $N_2O$ EF (kg/MMBtu) / 0.4536 (kg/lb)* |
| GWP - $CO_2$ | 1 | | *Table A-1 of 40 CFR 98, Subpart A* |
| GWP - $CH_4$ | 25 | | *Table A-1 of 40 CFR 98, Subpart A* |
| GWP - $N_2O$ | 298 | | *Table A-1 of 40 CFR 98, Subpart A* |

### SOURCE EMISSIONS

| *Pollutant* | *(lb/hr)* [a] | *(tons/yr)* [b] | |
|---|---|---|---|
| $NO_X$ | 3.65 | 0.91 | |
| CO | 0.70 | 0.18 | |
| $SO_2$ | 0.01 | 1.39E-03 | |
| Filterable PM/$PM_{10}$ | 0.13 | 0.03 | |
| Condensable PM | 0.02 | 3.93E-03 | |
| Total PM | 0.14 | 0.04 | |
| TOC | 0.14 | 0.04 | |
| $CO_2$ | 83.16 | 20.79 | |
| $CH_4$ | 2.36E-02 | 5.90E-03 | |
| $N_2O$ | 4.72E-03 | 1.18E-03 | |
| $CO_2e$ | 85.16 | 21.29 | *= $CO_2$ Emission (lb/hr or tpy) * $CO_2$ GWP + $CH_4$ Emissions (lb/hr or tpy) * $CH_4$ GWP + $N_2O$ Emissions (lb/hr or tpy) * $N_2O$ GWP* |

*[a] Hourly Calculations (lb/hr) = Emission Factor (g/hp-hr) * 510 (hp) / 453.593 (g/lb) / 2,000 (lb/ton)*
*or Hourly Calculations (lb/hr) = Emission Factor (lb/MMBtu) * Heat Input Capacity (MMBtu/hr) / 2,000 (lb/ton)*
*[b] Annual Calculations (tpy) = Emission Factor (g/hp-hr) * 500 (hrs/yr) * 510 (hp) / 453.593 (g/lb) / 2,000 (lb/ton)*
*or Annual Calculations (tpy) = Emission Factor (lb/MMBtu) * Heat Input Capacity (MMBtu/hr) * Operating Hours (hr/yr) / 2,000 (lb/ton)*

## Loaded Fleet Fire Pump (Tier 3) Engine Potential Emissions

### Hazardous Air Pollutant (HAP) Emissions

| Pollutant | Emission Factor (lb/MMBtu)[a] | Hourly Emissions (lb/hr)[b] | Annual Emissions (tons/yr)[c] |
|---|---|---|---|
| **HAPs:** | | | |
| 1,3-Butadiene | 3.91E-05 | 1.40E-04 | 3.49E-05 |
| Acetaldehyde | 7.67E-04 | 2.74E-03 | 6.85E-04 |
| Acrolein | 9.25E-05 | 3.30E-04 | 8.26E-05 |
| Acenaphthylene | 5.06E-06 | 1.81E-05 | 4.52E-06 |
| Acenaphthene | 1.42E-06 | 5.07E-06 | 1.27E-06 |
| Fluorene | 2.92E-05 | 1.04E-04 | 2.61E-05 |
| Phenanthrene | 2.94E-05 | 1.05E-04 | 2.62E-05 |
| Anthracene | 1.87E-06 | 6.68E-06 | 1.67E-06 |
| Fluoranthene | 7.61E-06 | 2.72E-05 | 6.79E-06 |
| Pyrene | 4.78E-06 | 1.71E-05 | 4.27E-06 |
| Benzo(a)anthracene | 1.68E-06 | 6.00E-06 | 1.50E-06 |
| Chrysene | 3.53E-07 | 1.26E-06 | 3.15E-07 |
| Benzo(b)fluoranthene | 9.91E-08 | 3.54E-07 | 8.84E-08 |
| Benzo(k)fluoranthene | 1.55E-07 | 5.53E-07 | 1.38E-07 |
| Benzo(a)pyrene | 1.88E-07 | 6.71E-07 | 1.68E-07 |
| Indeno(1,2,3-cd)pyrene | 3.75E-07 | 1.34E-06 | 3.35E-07 |
| Dibenz(a,h)anthracene | 5.83E-07 | 2.08E-06 | 5.20E-07 |
| Benzo(g,h,l)perylene | 4.89E-07 | 1.75E-06 | 4.36E-07 |
| Benzene | 9.33E-04 | 3.33E-03 | 8.33E-04 |
| Formaldehyde | 1.18E-03 | 4.21E-03 | 1.05E-03 |
| Naphthalene | 8.48E-05 | 3.03E-04 | 7.57E-05 |
| Toluene | 4.09E-04 | 1.46E-03 | 3.65E-04 |
| Xylene | 2.85E-04 | 1.02E-03 | 2.54E-04 |
| **Total HAP (Includes Formaldehyde)** | **3.87E-03** | **1.38E-02** | **3.46E-03** |

[a] *HAP emission factors from AP-42 Section 3.3, Table 3.3-2*
[b] *Hourly Emissions (lb/hr) = Rated Capacity (MMBtu/hr) × Emission Factor (lb/MMBtu)*
[c] *Annual Emissions (tpy) = Emissions (lb/hr) * Operating Hours (hr/yr) / 2,000 (lb/ton)*

**Tank Farm Lift Station Backup Pump (Tier 4) Engine Potential Emissions**

OPERATING PARAMETERS

| | | | |
|---|---|---|---|
| Fuel Used | Diesel | | |
| Power Output | 49.0 | kW | *Per manufacturer specifications for Isuzu 4LE2X (4L Lit Sheet for 66 HP/2400 RPM)* |
| Heat Input Capacity | 0.46 | MMBtu/hr | *= Power Output (kW ) * 1.341 hp// kW * 7000 (Btu/(hp-hr)) * 1x10$^{-6}$ MMBtu/Btu* |
| Operating Hours | 8,760 | hr/yr | |
| Maximum Hourly Fuel Usage | 24.4 | lb/hr | *Per CARB Certification for Isuzu 4LE2X (66 HP/2400 RPM)* engine model |
| Maximum Hourly Fuel Usage | 3.46 | gal/hr | *=Maximum hourly fuel usage (lb/hr) / Density of distillate oil (lb/gal)* |
| Maximum Annual Fuel Usage | 30,318 | gal/yr | *= Maximum Hourly Fuel Usage * Operating Hours (8,760 hrs/yr)* |

DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Power Conversion | 7,000 | Btu/hp-hr | *AP-42 Section 3.3, Table 3.3-1, Footnote 'a'* |
| Power Conversion | 745.6999 | W/hp | *NIST1038* |
| Mass Conversion | 453.59 | g/lb | *NIST1038* |
| Mass Conversion | 0.4536 | kg/lb | *NIST1038* |
| Mass Conversion | 2,000 | lb/ton | *NIST1038* |
| Time Conversion | 24 | hr/day | |
| Density of Diesel | 7.05 | lb/gal | *Density of distillate oil from Densities of Selected Substances, pg A-7, AP-42 Appendix A, (9/85)* |
| Sulfur Dioxide ($SO_2$), Molecular Weight | 64.064 | lb/lb-mole | *NIST Chemistry WebBook, SRD 69* |
| Sulfur (S), Molecular Weight | 32.065 | lb/lb-mole | *NIST Chemistry WebBook, SRD 69* |

EMISSION FACTOR DEVELOPMENT

| | | | |
|---|---|---|---|
| Diesel Energy Content | 19,300 | Btu/lb | *AP-42 Section 3.3, Table 3.3-1, Footnote 'c'* |
| Not to Exceed Multiplier - $NO_X$ ,PM, and NMHC | 1.50 | | *40 CFR 1039.101(e)(3). Assumes worst-case for all pollutants listed* |
| Not to Exceed Multiplier - CO | 1.25 | | *40 CFR 1039.101(e)* |
| Sulfur Content (Non-Road Diesel Fuel) | 15 | ppm | *40 CFR 60.4207(b) and 40 CFR 80.510(b)* |

## Tank Farm Lift Station Backup Pump (Tier 4) Engine Potential Emissions

### EMISSION FACTORS

| *Pollutant* | *Emission Factor* | *Units* | |
|---|---|---|---|
| $NO_X$+NMHC | 7.05 | g/kW-hr | *Final Tier 4 Certified, 40 CFR 1039.101(b) Table 1, 19 ≤kW ≤56(g/kW-hr), x Not to Exceed Multiplier (1.5)* |
| $NO_X$ Tier 4 standard for 56<kW<130 kW engine | 0.40 | g/kW-hr | *Final Tier 4 Certified, 40 CFR 1039.101(b) Table 1, 56 ≤kW ≤130 (g/kW-hr), x Not to Exceed Multiplier (1.5)* |
| NMHC Tier 4 standard for 56<kW<130 kW engine | 0.19 | g/kW-hr | *Final Tier 4 Certified, 40 CFR 1039.101(b) Table 1, 56 ≤kW ≤130(g/kW-hr), x Not to Exceed Multiplier (1.5)* |
| $NO_X$ | 4.78 | g/kW-hr | *=NOX+NMHC std (g/kW-hr) x NOX Tier 4 std for 56-130 kW engine (g/kW-hr)/[NOX Tier 4 std for 56-130 kW engine (g/kW-hr)+NMHC Tier 4 std for 56-130 kW engine (g/kW-hr)]* |
| NMHC | 2.27 | g/kW-hr | *=NOX+NMHC std (g/kW-hr) x NOX Tier 4 std for 56-130 kW engine (g/kW-hr)/[NMHC Tier 4 std for 56-130 kW engine (g/kW-hr)+NMHC Tier 4 std for 56-130 kW engine (g/kW-hr)]* |
| CO | 6.25 | g/kW-hr | *Final Tier 4 Certified, 40 CFR 1039.101(b) Table 1, 19 ≤kW ≤56(g/kW-hr), x Not to Exceed Multiplier (1.5)* |
| $SO_2$ | 7.14E-04 | lb/hr | *= (Sulfur Content (ppm) x $10^{-6}$ ) x [Heat Input Capacity -(MMBtu/hr) x $10^{6}$ (btu/MMBtu) / Diesel Energy Content (btu/lb)] x [ 1 lbmole $SO_2$ / 1 lbmole S] x [$SO_2$ M.W./ Sulfur M.W.]* |
| Filterable PM/$PM_{10}$ | 0.05 | g/kW-hr | *Final Tier 4 Certified, 40 CFR 1039.101(b) Table 1, 19 ≤kW ≤56(g/kW-hr), x Not to Exceed Multiplier (1.5)* |
| Condensable PM Factor | 7.70E-03 | lb/MMBtu | *AP-42, Section 3.4, Table 3.4-2* |
| Filterable PM Factor | 0.06 | lb/MMBtu | *AP-42, Section 3.4, Table 3.4-2* |
| Condensable PM | 5.59E-03 | g/kW-hr | *Condensable emission factor (g/kW-hr) = (Condensable Particulate Emission Factor (lb/MMBtu) / (Filterable Particulate Emission Factor (lb/MMBtu)) x Filterable Emission Factor (g/kW-hr) where the ratio is taken from section AP-42, Section 3.4,Table 3.4-2* |
| Total PM | 0.05 | g/kW-hr | *= Filterable PM/$PM_{10}$ EF (g/kW-hr) + Condensable PM EF (g/kW-hr)* |
| Formaldehyde | 1.18E-03 | lb/MMBtu | *AP-42, Section 3.3, Table 3.3-2* |
| Total HAP | 1.68E-04 | lb/MMBtu | *AP-42, Section 3.3, Table 3.3-2* |
| $CO_2$ | 73.96 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-1 for Distillate Fuel Oil No. 2* |
| $CH_4$ | 3.00E-03 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-2 for Petroleum* |
| $N_2O$ | 6.00E-04 | kg/MMBtu | *40 CFR 98, Subpart C, Table C-2 for Petroleum* |
| GWP - $CO_2$ | 1 | | *Table A-1 of 40 CFR 98, Subpart A* |
| GWP - $CH_4$ | 25 | | *Table A-1 of 40 CFR 98, Subpart A* |
| GWP - $N_2O$ | 298 | | *Table A-1 of 40 CFR 98, Subpart A* |

## Tank Farm Lift Station Backup Pump (Tier 4) Engine Potential Emissions

**POTENTIAL EMISSIONS**

| *Pollutant* | *(lbs/hr)* | *(tons/yr)* |
|---|---|---|
| $NO_X$ [a] | 0.52 | 2.26 |
| CO [a] | 0.68 | 2.96 |
| $SO_2$ [b] | 7.14E-04 | 3.13E-03 |
| Filterable PM/PM2.5/$PM_{10}$ [a] | 4.86E-03 | 2.13E-02 |
| Condensable PM [a] | 6.04E-04 | 2.64E-03 |
| Total PM [a] | 5.46E-03 | 2.39E-02 |
| VOC[a] | 0.25 | 1.07 |
| Formaldehyde[c,d] | 5.43E-04 | 2.38E-03 |
| Total HAP[c,d] | 7.73E-05 | 3.39E-04 |
| $CO_2$ [e] | - | 3.28E+02 |
| $CH_4$ [e] | - | 1.33E-02 |
| $N_2O$ [e] | - | 2.66E-03 |
| $CO_2e$ [f] | - | 3.30E+02 |

[a] *Hourly Emissions (lbs/hr)= Emission Factor (g/kW-hr) x Maximum Power Output (kW) / 453.59 (g/lb)*
*Annual Emission (tpy)= Emission Factor (g/kW-hr) x Maximum Power Output (kW) x Operating hours (hr/yr) / 453.59 (g/lb) / 2,000 (lbs/ton)*

[b] *Hourly Emissions (lbs/hr)= $SO_2$ Emission Factor (lb/hr) Annual Emission (tpy)= $SO_2$ Emission Factor (lb/hr) x Operating hours (hr/yr) / 2,000 (lbs/ton)*

[c] *Hourly Emission (lbs/hr) = Emission Factor (lb/MMBtu) x Maximum Heat Input Capacity (MMBtu/hr)*

[d] *Annual Emission (tons/yr) = Emission Factor (lb/MMBtu) x Maximum Heat Input Capacity (MMBtu/hr) x Operating Hours (hrs/yr) / 2,000 (lbs/ton)*

[e] *Annual Emissions (tons/yr) = Emission Factor (kg/MMBtu) x Maximum Heat Input Capacity (MMBtu/hr) x Operating Hours (hrs/yr) / 0.4536 (kg/lb) / 2,000 (lbs/ton)*

[f] *$CO_2e$ Emissions (tons/yr) = Annual $CO_2$ Emission (tpy) * $CO_2$ GWP + Annual $CH_4$ Emissions (tpy) * $CH_4$ GWP + Annual $N_2O$ Emissions (tpy) * $N_2O$ GWP*

## Tank Farm Lift Station Backup Pump (Tier 4) Engine Potential Emissions

### Hazardous Air Pollutant (HAP) Emissions - Section 3.3

| Pollutant | Emission Factor (lb/MMBtu) | Annual Emissions (lb/hr) | Annual Emissions (tons/yr) | HAP |
|---|---|---|---|---|
| Benzene | 9.33E-04 | 4.29E-04 | 1.88E-03 | Y |
| Toluene | 4.09E-04 | 1.88E-04 | 8.24E-04 | Y |
| Xylene | 2.85E-04 | 1.31E-04 | 5.74E-04 | Y |
| Propyelene | 2.58E-03 | 1.19E-03 | 5.20E-03 | N |
| 1,3-Butadiene | 3.91E-05 | 1.80E-05 | 7.88E-05 | Y |
| Formaldehyde | 1.18E-03 | 5.43E-04 | 2.38E-03 | Y |
| Acetaldehyde | 7.67E-04 | 3.53E-04 | 1.55E-03 | Y |
| Acrolein | 9.25E-05 | 4.25E-05 | 1.86E-04 | Y |
| Naphthalene | 8.48E-05 | 3.90E-05 | 1.71E-04 | Y |
| Acenaphthylene | 5.06E-06 | 2.33E-06 | 1.02E-05 | Y |
| Acenaphthene | 1.42E-06 | 6.53E-07 | 2.86E-06 | Y |
| Fluorene | 2.92E-05 | 1.34E-05 | 5.88E-05 | Y |
| Phenanthrene | 2.94E-05 | 1.35E-05 | 5.92E-05 | Y |
| Anthracene | 1.87E-06 | 8.60E-07 | 3.77E-06 | Y |
| Fluoranthene | 7.61E-06 | 3.50E-06 | 1.53E-05 | Y |
| Pyrene | 4.78E-06 | 2.20E-06 | 9.63E-06 | Y |
| Benzo(a)anthracene | 1.68E-06 | 7.73E-07 | 3.38E-06 | Y |
| Chrysene | 3.53E-07 | 1.62E-07 | 7.11E-07 | Y |
| Benzo(b)fluoranthene | 9.91E-08 | 4.56E-08 | 2.00E-07 | Y |
| Benzo(k)fluoranthene | 1.55E-07 | 7.13E-08 | 3.12E-07 | Y |
| Benzo(a)pyrene | 1.88E-07 | 8.65E-08 | 3.79E-07 | Y |
| Indeno(1,2,3-cd)pyrene | 3.75E-07 | 1.72E-07 | 7.56E-07 | Y |
| Dibenz(a,h)anthracene | 5.83E-07 | 2.68E-07 | 1.17E-06 | Y |
| Benzo(g,h,l)perylene | 4.89E-07 | 2.25E-07 | 9.85E-07 | Y |
| **Total HAP** | **1.68E-04** | **2.97E-03** | **3.39E-04** | |

## Paved Roads Potential Emissions

$$E = [k (sL)^{0.91} * (W)^{1.02} + C] * (1-P/4N)$$

*AP-42 Section 13.2.1, Equation 1 (January 2011); Emission factor equation for Paved Roads, AP-42 Section 13.2.1, Equation 1 (January 2011). Equation 1 has been modified to add the C factors from the November 2006 edition of AP-42 into the empirical equation to account for emissions from tire wear, brake wear, and exhaust.*

### SITE PARAMETERS

***One-Way Road Lengths*** [a]

| | | |
|---|---|---|
| Path 1 - Office Employees | 0.22 | miles |
| Path 2 - Far Dock Operators | 0.81 | miles |
| Path 3 - A-300 (Dye) Truck Traffic | 0.22 | miles |
| Path 4 - A-301 (Additive) Truck Traffic | 0.17 | miles |
| Path 5 - Butane Truck Enter Path | 0.14 | miles |
| Path 6 - Butane Truck Exit Path | 0.10 | miles |

[a] *Length of each road segment is determined using Google Earth*

***Vehicle Pathways***

| *Vehicle Type* | *Entering Weight (tons)* | *Entering Pathway* | *Exiting Weight (tons)* | *Exiting Pathway* | *Annual Maximum (#/year)* | *VMT Entering the Facility on Paved Roads (miles/yr)* [b] | *VMT Exiting the Facility on Paved Roads (miles/yr)* [b] |
|---|---|---|---|---|---|---|---|
| Employee Cars | 2 | 1 | 2 | 1 | 25,550 | 5,565 | 5,565 |
| Employee Cars (Far Dock Operators) | 2 | 2 | 2 | 2 | 1,825 | 1,469 | 1,469 |
| Raw Material Trucks (A-300) | 40 | 3 | 13 | 3 | 4 | 1 | 1 |
| Raw Material Trucks (A-301) | 40 | 4 | 13 | 4 | 4 | 1 | 1 |
| Butane Trucks - Unloading at the facility | 40 | 5 | 13 | 6 | 2,442 | 342 | 244 |

[b] *Total VMT on Paved Roads = Total Length of the Paved Pathway Travelled by each Vehicle (miles) * Max. Number of Vehicles Travelling the Pathway (Vehicles/yr)*

| | | | |
|---|---|---|---|
| Average Vehicle Weight | 3.1 | tons | *Weighted against vehicle miles travelled on paved roads* |
| Total Vehicle Miles Travelled | 14,657 | VMT/yr | *Sum of VMT for all vehicles entering and exiting facility on paved roads* |
| Silt Loading (s) | 0.6 | $g/m^2$ | *AP-42 Section 13.2.1, Table 13.2.1-2 (January 2011)* |
| Number of Days in Averaging Period (N) | 365 | days | |
| Number of Days w/ at least 0.01" of Precipitation | 140 | days | *AP-42 Section 13.2.2, Figure 13.2.2-1* |

## Paved Roads Potential Emissions

### EMISSION PARAMETERS[c]

| | | | |
|---|---|---|---|
| Particle Size Multiplier (k) - PM | 0.011 | lb/VMT | *AP-42 Section 13.2.1, Table 13.2.1-1 (January 2011)* |
| Particle Size Multiplier (k) - $PM_{10}$ | 0.0022 | lb/VMT | *AP-42 Section 13.2.1, Table 13.2.1-1 (January 2011)* |
| Particle Size Multiplier (k) - $PM_{2.5}$ | 0.00054 | lb/VMT | *AP-42 Section 13.2.1, Table 13.2.1-1 (January 2011)* |
| Empirical Constant, a | 0.91 | | *AP-42 Section 13.2.1, Equation (1) (January 2011)* |
| Empirical Constant, b | 1.02 | | *AP-42 Section 13.2.1, Equation (1) (January 2011)* |
| Brake Wear and Tire Wear Factor (C ) - PM/$PM_{10}$ | 0.00047 | lb/VMT | *AP-42, Section 13.2.1, Table 13.2.1-2 (November 2006)* |
| Brake Wear and Tire Wear Factor (C ) - $PM_{2.5}$ | 0.00036 | lb/VMT | *AP-42, Section 13.2.1, Table 13.2.1-2 (November 2006)* |
| PM Emission Factor | 2.0E-02 | lb/VMT | $E = [k (s)^{0.91} (W)^{1.02} + C] * (1-P/4N)$, *where N=365 day/yr* |
| $PM_{10}$ Emission Factor | 4.4E-03 | lb/VMT | $E = [k (s)^{0.91} (W)^{1.02} + C] * (1-P/4N)$ |
| $PM_{2.5}$ Emission Factor | 1.3E-03 | lb/VMT | $E = [k (s)^{0.91} (W)^{1.02} + C] * (1-P/4N)$ |

[c] *PM = $PM_{30}$*

### DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| 1 ton | 2,000 | lbs | *NIST SP1038* |
| 1 yr | 365 | days | |

### POTENTIAL EMISSIONS

| Pollutant | (tpy)[d] |
|---|---|
| PM | 0.15 |
| $PM_{10}$ | 0.03 |
| $PM_{2.5}$ | 0.01 |

[d] *Emissions (tpy) = Emissions (lb/day) * 365 (days/yr) / 2000 (lb/ton)*

## LDAR Components Potential Emissions

### EMISSION FACTORS AND OPERATING PARAMETERS[a]

| Component Type | Heavy Liquid Service[b] | | Light Liquid Service | | Gas Vapor Service | |
|---|---|---|---|---|---|---|
| | kg/hr | lb/hr | kg/hr | lb/hr | kg/hr | lb/hr |
| Valve | 4.30E-05 | 9.48E-05 | 4.30E-05 | 9.48E-05 | 1.30E-05 | 2.87E-05 |
| Pump Seal | 5.40E-04 | 1.19E-03 | 5.40E-04 | 1.19E-03 | | |
| Fitting | 8.00E-06 | 1.76E-05 | 8.00E-06 | 1.76E-05 | 4.20E-05 | 9.26E-05 |
| Other (e.g., PRD) | 1.30E-04 | 2.87E-04 | 1.30E-04 | 2.87E-04 | 1.20E-04 | 2.65E-04 |

[a] *EPA Protocol for Equipment Leak Emission Estimates, Office of Air Quality, Planning and Standards, Research Triangle Park, NC 27711. EPA-453/R-95-017 November 1995, Table 2-3 Marketing Terminal Average Emission Factors*

[b] *Factors for heavy liquid are assumed to be equivalent to factors used for light liquids from EPA Protocol for Equipment Leak Emission Estimates, Office of Air Quality, Planning and Standards, Research Triangle Park, NC 27711. EPA-453/R-95-017 November 1995, Table 2-3 Marketing Terminal Average Emission Factors (used due to absence of heavy liquid factors in Table 2-3; applies emission factor provided for 'Connectors' to 'Fittings')*

### DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Time Conversion | 365 | day/yr | |
| Time Conversion | 24 | hr/day | |
| Mass Conversion | 2,000 | lb/ton | *NIST SP1038* |
| Mass Conversion | 0.454 | kg/lb | *NIST SP1038* |

### COMPONENT COUNT ESTIMATES - GASOLINE/DISTILLATE SERVICE

| No. of Components | Heavy Liquid Service | Light Liquid Service | Gas Vapor Service | |
|---|---|---|---|---|
| Valves | 1,088 | 974 | 185 | |
| Pump Seals | 22 | 20 | | |
| Fittings/Connectors | 3,062 | 2,623 | 556 | *fittings include connectors, flanges, and threaded unions* |
| Other (e.g., PRDs) | 29 | 25 | 4 | |

## LDAR Components Potential Emissions

### COMPONENT COUNT ESTIMATES - BUTANE SERVICE (NO HAP)

| No. of Components | Heavy Liquid Service | Light Liquid Service | Gas Vapor Service |
|---|---|---|---|
| Valves | | 13 | 6 |
| Pump Seals | | 7 | |
| Fittings/Connectors | | 400 | |
| Other (e.g., PRDs) | | | 8 |

*fittings include connectors, flanges, and threaded unions*

### COMPOSITION DATA

| | |
|---|---|
| VOC Composition | 100% |

*Assuming 100% of material is VOC*

### POTENTIAL EMISSIONS CALCULATIONS - GASOLINE/DISTILLATE SERVICE

*Emissions by Component Type (lb/yr) = No. of Components * EF for Component (lb/hr) * 365 (day/yr) * 24 (hr/day) * VOC Composition (%)*

| Component Type | Heavy Liquid Service (lb/yr) | Light Liquid Service (lb/yr) | Gas Vapor Service (lb/yr) |
|---|---|---|---|
| Valves | 904 | 809 | 46 |
| Pump Seals | 229 | 209 | 0 |
| Fittings | 473 | 405 | 451 |
| Other | 73 | 63 | 9 |
| **Total** | 1,679 | 1,485 | 507 |

### POTENTIAL EMISSIONS CALCULATIONS - BUTANE SERVICE (NO HAP)

*Emissions by Component Type (lb/yr) = No. of Components * EF for Component (lb/hr) * 365 (day/yr) * 24 (hr/day) * VOC Composition (%)*

| Component Type | Heavy Liquid Service (lb/yr) | Light Liquid Service (lb/yr) | Gas Vapor Service (lb/yr) |
|---|---|---|---|
| Valves | 0 | 5 | 5 |
| Pump Seals | 0 | 33 | 0 |
| Fittings | 0 | 28 | 0 |
| Other | 0 | 0 | 20 |
| **Total** | 0 | 66 | 25 |

### POTENTIAL EMISSIONS TOTALS

| Total LDAR VOC PTE | |
|---|---|
| 3,762 | lb/yr |
| 1.88 | tpy |

## Butane Blending and Hose Disconnect Potential Emissions

### DIMENSIONAL ANALYSIS

| | | | |
|---|---|---|---|
| Volume Conversion | 42 | gallons/bbl | |
| Volume Conversion | 3,785.41 | cc/gal | |
| Mass Conversion | 2,000 | lb/ton | |

### BUTANE OFFLOAD SYSTEM HOSE DISCONNECT LOSSES - TRUCKS

| | | | |
|---|---|---|---|
| Butane transport truck load | 193 | bbl/truck | *Average Truck capacity varies from 180 to 205 bbl.* |
| Disconnect losses per connector | 0.35 | cc/event | *Estimate release volume from TODO disconnect joints* |
| Disconnect losses per connector | 9.25E-05 | gallons/event | *Disconnect losses per connect (cc/event) / Conversion factor (cc/gallon)* |
| Butane Density | 4.9 | lb/gal | *at 60 °F* |
| Connectors disconnected per event | 1 | connector | *One hose, one connector at each end of hose. Only one side will be disconnected per unloading event.* |
| Transport trucks per hour | 1 | trucks/hr | *Assumes no more than one truck can be unloaded per hour* |
| Transport trucks per day | 20 | trucks/day | *Estimated maximum number of trucks* |
| Transport trucks per year | 2,442 | trucks/yr | *Estimated based on maximum of 470,000 bbls and average truck capacity of 192.5 bbl.* |
| Disconnect events per year | 2,442 | events per year | *= Transport Trucks per year x number of connectors disconnected per truck* |

### POTENTIAL EMISSIONS - TRUCKS

| | | | |
|---|---|---|---|
| VOC from Hose Disconnect Events | 4.53E-04 | lb/hr | *Disconnect losses per connector (gal/event) x Butane Density (lb/gal) x Connectors disconnected x Disconnect events (events/hr). Assumes no more than 1 truck per hour.* |
| VOC from Hose Disconnect Events | 9.06E-03 | lb/day | *Disconnect losses per connector (gal/event) x Butane Density (lb/gal) x Connectors disconnected x Disconnect events (events/day). Assumes 20 trucks per day.* |
| VOC from Hose Disconnect Events | 5.53E-04 | tons/year | *Disconnect losses per connector (gal/event) x Butane Density (lb/gal) x Connectors disconnected x Disconnect events (events/yr) / 2,000 (lb/ton)* |

## Wastewater System Potential Emissions

**This sheet is used for wastewater collection systems**. Directions: 1) input the number of collection system components for each process drainage area; 2) input the process drainage area point-of-generation concentrations and flow rate (yellow boxes); 3) review the default air emissions control efficiencies and change if necessary; and 4) record the collection system air emissions and wastewater concentrations for downstream process units air emissions calculations (green boxes).

| Collection System Component | Process Drainage Area #1 | |
|---|---|---|
| Number of uncontrolled drains | 0 | |
| Number of sealed drains | 46 | |
| Linear meters of open trench | 0 | |
| Number of uncontrolled manholes | 0 | |
| Number of sealed manholes | 0 | |
| Number of uncontrolled junction boxes | 0 | |
| Number of controlled junction boxes | 23 | *Includes catch basins and junction boxes* |
| Number of uncontrolled lift stations | 0 | |
| Number of controlled lift stations | 1 | |
| Number of uncontrolled sumps | 0 | |
| Number of controlled sumps | 10 | |

| Collection System Component Air Emissions Control | Control Efficiency, % | Default Control Efficiency, % |
|---|---|---|
| Drain water seal | 95 | 95 |
| Manhole seal | 95 | 95 |
| Junction box water seal | 95 | 95 |
| Lift station control (e.g., carbon adsportion) | 95 | 95 |
| Sump control (e.g., carbon adsorption) | 95 | 95 |

| | Process Drainage Area #1 | | | | |
|---|---|---|---|---|---|
| Wastewater flow rate (Q) | 1.68E-03 | $m^3/s$ | | | *Assumes Wastewater Flow = Assumed Max Organic Phase Flow from Tank 256 + 2013 Aqueous Flow* |
| **Compound Name** | **POG Concentration[a]** | **Units** | **Air Emissions** | **Units** | |
| Methanol | 0.0000 | $g/m^3$ | 0 | g/s | |
| Benzene | 101.3164 | $g/m^3$ | 0.005189255 | g/s | |
| Carbon disulfide | 0.0000 | $g/m^3$ | 0 | g/s | |
| Methyl ethyl ketone | 0.0000 | $g/m^3$ | 0 | g/s | |
| Naphthalene | 29.3817 | $g/m^3$ | 0.001026649 | g/s | |
| Cumene | 37.4870 | $g/m^3$ | 0.002158839 | g/s | |
| Ethylbenzene | 89.1584 | $g/m^3$ | 0.004770573 | g/s | |
| Styrene | 0.0000 | $g/m^3$ | 0 | g/s | |
| 1,3-Butadiene | 0.0000 | $g/m^3$ | 0 | g/s | |
| Ethylene glycol | 0.0000 | $g/m^3$ | 0 | g/s | |
| Methyl isobutyl ketone | 0.0000 | $g/m^3$ | 0 | g/s | |
| Toluene | 334.3440 | $g/m^3$ | 0.017510324 | g/s | |
| Phenol | 0.0000 | $g/m^3$ | 0 | g/s | |
| n-Hexane | 354.6072 | $g/m^3$ | 0.025386867 | g/s | |
| Cresols (total) | 0.0000 | $g/m^3$ | 0 | g/s | |
| Xylenes | 364.7389 | $g/m^3$ | 0.018873689 | g/s | |
| Methyl tert-butyl ether | 0.0000 | $g/m^3$ | 0 | g/s | |
| Biphenyl, 1,1- | 0.0000 | $g/m^3$ | 0 | g/s | |
| Carbonyl sulfide | 0.0000 | $g/m^3$ | 0 | g/s | |
| Dichloroethane, 1,2- | 0.0000 | $g/m^3$ | 0 | g/s | |
| Diethanolamine | 0.0000 | $g/m^3$ | 0 | g/s | |
| Trimethylpentane, 2,2,4- | 199.5932 | $g/m^3$ | 0.018488348 | g/s | |
| n-Butane (VOC Surrogate) | 8206.6244 | $g/m^3$ | 0.698009349 | g/s | |

[a]For benzene, POG concentration obtained from 'Kenova TAB Contribution' spreadsheet.

[b]For non-benzene pollutants, POG concentration obtained using the ratios from Table 7-9. Refinery Wastewater Contaminant Concentrations as a Ratio to Benzene provided in "Emission Estimation Protocol for Petroleum Refineries" Version 2.1.1 (5/2011); specifically, Pollutant Concentration ($g/m^3$) = Benzene Concentration ($g/m^3$) * Table 7-9. Pollutant-Specific Factor

## Wastewater System Potential Emissions

| OUTPUTS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Compound Name | Total Emissions | Units | Collection System Effluent Concentration | Units | POG Total Load | Units | Total Emissions | Units |
| Methanol | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Benzene | 0.005189 | g/s | | | | | 360.78 | lb/yr |
| Carbon disulfide | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Methyl ethyl ketone | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Naphthalene | 0.001027 | g/s | | | | | 71.38 | lb/yr |
| Cumene | 0.002159 | g/s | | | | | 150.09 | lb/yr |
| Ethylbenzene | 0.004771 | g/s | | | | | 331.67 | lb/yr |
| Styrene | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| 1,3-Butadiene | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Ethylene glycol | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Methyl isobutyl ketone | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Toluene | 0.017510 | g/s | | | | | 1217.40 | lb/yr |
| Phenol | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| n-Hexane | 0.025387 | g/s | | | | | 1765.02 | lb/yr |
| Cresols (total) | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Xylenes | 0.018874 | g/s | | | | | 1312.19 | lb/yr |
| Methyl tert-butyl ether | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Biphenyl, 1,1- | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Carbonyl sulfide | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Dichloroethane, 1,2- | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Diethanolamine | 0.000000 | g/s | | | | | 0.00 | lb/yr |
| Trimethylpentane, 2,2,4- | 0.018488 | g/s | | | | | 1285.40 | lb/yr |
| n-Butane (VOC Surrogate) | 0.698009 | g/s | | | | | 48529.09 | lb/yr |
| **Total HAP Emissions** | | | | | | | **6,493.9** | **lb/yr** |
| **Total HAP Emissions** | | | | | | | **3.2** | **tpy** |
| **Total VOC Emissions** | | | | | | | **48,529.1** | **lb/yr** |
| **Total VOC Emissions** | | | | | | | **24.3** | **tpy** |

| Compound Name | fe, Drains | fe, Sealed Drains | fe, Trenches | fe, Manholes | fe, Sealed Manholes | fe, Junction Boxes | fe, Controlled Junction Boxes | fe, Lift Stations | fe, Controlled Lift Stations | fe, Sumps | fe, Controlled Sumps |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Methanol | 0.000E+00 | 0.000E+00 | 4.298E-03 | 0.000E+00 | 0.000E+00 | 1.245E-02 | 6.223E-04 | 3.253E-02 | 1.626E-03 | 2.080E-03 | 1.040E-04 |
| Benzene | 2.263E-01 | 1.131E-02 | 3.986E-02 | 5.690E-02 | 2.845E-03 | 8.712E-02 | 4.356E-03 | 2.544E-01 | 1.272E-02 | 4.925E-03 | 2.462E-04 |
| Carbon disulfide | 2.854E-01 | 1.427E-02 | 4.830E-02 | 7.211E-02 | 3.605E-03 | 1.049E-01 | 5.243E-03 | 3.071E-01 | 1.536E-02 | 5.600E-03 | 2.800E-04 |
| Methyl ethyl ketone | 6.518E-02 | 3.259E-03 | 1.684E-02 | 1.547E-02 | 7.736E-04 | 3.878E-02 | 1.939E-03 | 1.108E-01 | 5.540E-03 | 3.083E-03 | 1.542E-04 |
| Naphthalene | 1.407E-01 | 7.033E-03 | 2.762E-02 | 3.488E-02 | 1.744E-03 | 6.143E-02 | 3.071E-03 | 1.781E-01 | 8.904E-03 | 3.946E-03 | 1.973E-04 |
| Cumene | 2.600E-01 | 1.300E-02 | 4.467E-02 | 6.556E-02 | 3.278E-03 | 9.722E-02 | 4.861E-03 | 2.844E-01 | 1.422E-02 | 5.309E-03 | 2.655E-04 |
| Ethylbenzene | 2.384E-01 | 1.192E-02 | 4.158E-02 | 6.001E-02 | 3.000E-03 | 9.074E-02 | 4.537E-03 | 2.652E-01 | 1.326E-02 | 5.063E-03 | 2.531E-04 |
| Styrene | 2.015E-01 | 1.008E-02 | 3.632E-02 | 5.053E-02 | 2.527E-03 | 7.969E-02 | 3.985E-03 | 2.323E-01 | 1.162E-02 | 4.642E-03 | 2.321E-04 |
| 1,3-Butadiene | 3.166E-01 | 1.583E-02 | 5.275E-02 | 8.012E-02 | 4.006E-03 | 1.142E-01 | 5.710E-03 | 3.349E-01 | 1.674E-02 | 5.956E-03 | 2.978E-04 |
| Ethylene glycol | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Methyl isobutyl ketone | 9.682E-02 | 4.841E-03 | 2.136E-02 | 2.361E-02 | 1.180E-03 | 4.828E-02 | 2.414E-03 | 1.390E-01 | 6.950E-03 | 3.445E-03 | 1.722E-04 |
| Toluene | 2.324E-01 | 1.162E-02 | 4.073E-02 | 5.847E-02 | 2.923E-03 | 8.895E-02 | 4.447E-03 | 2.598E-01 | 1.299E-02 | 4.994E-03 | 2.497E-04 |
| Phenol | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.104E-03 | 5.521E-05 |
| n-Hexane | 3.343E-01 | 1.671E-02 | 5.528E-02 | 8.467E-02 | 4.233E-03 | 1.195E-01 | 5.976E-03 | 3.507E-01 | 1.753E-02 | 6.159E-03 | 3.079E-04 |
| Cresols (total) | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.603E-03 | 8.013E-05 | 3.078E-04 | 1.539E-05 | 1.667E-03 | 8.334E-05 |
| Xylenes | 2.291E-01 | 1.145E-02 | 4.025E-02 | 5.762E-02 | 2.881E-03 | 8.795E-02 | 4.398E-03 | 2.569E-01 | 1.284E-02 | 4.956E-03 | 2.478E-04 |
| Methyl tert-butyl ether | 1.455E-01 | 7.276E-03 | 2.832E-02 | 3.613E-02 | 1.807E-03 | 6.289E-02 | 3.144E-03 | 1.824E-01 | 9.121E-03 | 4.001E-03 | 2.001E-04 |
| Biphenyl, 1,1- | 1.216E-01 | 6.079E-03 | 2.490E-02 | 2.997E-02 | 1.499E-03 | 5.570E-02 | 2.785E-03 | 1.611E-01 | 8.053E-03 | 3.728E-03 | 1.864E-04 |
| Carbonyl sulfide | 3.025E-01 | 1.512E-02 | 5.074E-02 | 7.649E-02 | 3.825E-03 | 1.100E-01 | 5.499E-03 | 3.223E-01 | 1.612E-02 | 5.795E-03 | 2.898E-04 |
| Dichloroethane, 1,2- | 1.779E-01 | 8.895E-03 | 3.294E-02 | 4.446E-02 | 2.223E-03 | 7.260E-02 | 3.630E-03 | 2.113E-01 | 1.056E-02 | 4.371E-03 | 2.186E-04 |
| Diethanolamine | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Trimethylpentane, 2,2,4- | 4.467E-01 | 2.233E-02 | 7.134E-02 | 1.136E-01 | 5.679E-03 | 1.532E-01 | 7.662E-03 | 4.509E-01 | 2.254E-02 | 7.443E-03 | 3.722E-04 |
| n-Butane (VOC Surrogate) | 4.061E-01 | 2.031E-02 | 6.554E-02 | 1.031E-01 | 5.157E-03 | 1.411E-01 | 7.053E-03 | 4.147E-01 | 2.073E-02 | 6.979E-03 | 3.490E-04 |

## Wastewater System Potential Emissions

**Process Parameters / Conversion Factors**

| | | | |
|---|---|---|---|
| Benzene Concentration in Aqueous Phase | 3.30 | ppmw | *Assumes benzene concentration is the maximum concentration obtained from 'Kenova TAB Contribution' spreadsheet* |
| Benzene Concentration in Organic Phase | 8,688 | ppmw | *Assumes benzene concentration is the maximum concentration obtained from 'Kenova TAB Contribution' spreadsheet* |
| Aqueous Flow | 12,538,218 | gal/yr | *Obtained from 'Kenova TAB Contribution' spreadsheet* |
| Organic Flow | 214,136 | gal/yr | *Obtained from 'Kenova TAB Contribution' spreadsheet* |
| Liquid Density of Aqueous Phase | 8.35 | lb/gal | *assumes water* |
| Liquid Density of Organic Phase | 5.60 | lb/gal | *Per AP-42, Table 7.1-2 (assumes gasoline RVP 10)* |
| Mass Aqueous Flow | 104,636,500 | lb/yr | *= Volumetric Flow Rate (gal/yr) * Density (lb/gal)* |
| Mass Organic Flow | 1,199,160 | lb/yr | *= Volumetric Flow Rate (gal/yr) * Density (lb/gal)* |
| Benzene Flow | 10,763 | lb/yr | *= (Aq Benzene Concentration (ppmw) * Aq Mass Flow (lb/yr) + Org Benzene Concentration (ppmw) * Org Mass Flow (lb/yr)) / (1,000,000 ppm)* |
| Weighted Avg Benzene Concentration | 101.7 | ppmw | *= Total Benzene Flow (lb/yr) / Total Liquid Flow (lb/yr) / 1,000,000 (ppmw)* |
| Weighted Avg Liquid Density | 8.31 | lb/gal | *= (Aq Benzene Density (lb/gal * Aq Mass Flow (lb/yr) + Org Benzene Density (lb/gal) * Org Mass Flow (lb/yr)) / (Total Liquid Flow (gal/yr))* |
| Weighted Avg Liquid Density | 996,272.6 | g/m$^3$ | *= Weighted Avg Liquid Density (lb/gal) * 453.593 (g/lb) / 264.17 (gal/m$^3$)* |
| Benzene Weighted Average Concentration | 101.3 | g/m$^3$ | *=Weighted Avg Benzene Concentration (ppmw) * Weighted Avg Liquid Density (g/m$^3$) / 1,000,000 (ppmw)* |
| Volume Conversion | 264.17 | gal/m$^3$ | |
| Conversion | 1,000,000 | units/MMunit | |
| Time Conversion | 8,760 | hr/yr | |
| Time Conversion | 3,600 | sec/hr | |
| Mass Conversion | 2,000 | lb/ton | |
| Mass Conversion | 0.45 | kg/lb | |
| Mass Conversion | 1,000 | g/kg | |

**Table 7-9. Refinery Wastewater Contaminant Concentrations as a Ratio to Benzene**
**Emission Estimation Protocol for Petroleum Refineries Version 3 (4/2015)**

| CAS | HAP | Mass Concentration Ratio of Compounds to the Concentration of Benzene: Inlet to OWS | Outlet from OWS |
|---|---|---|---|
| 540841 | Trimethylpentane, 2,2,4- | 1.97 | 0.022 |
| 71432 | Benzene | 1 | 1 |
| 98828 | Cumene | 0.37 | 0.013 |
| 100414 | Ethylbenzene | 0.88 | 0.086 |
| 110543 | N-Hexane | 3.5 | 0.047 |
| 91203 | Naphthalene | 0.29 | 0.02 |
| 108883 | Toluene | 3.3 | 0.8 |
| 1330207 | Xylenes | 3.6 | 0.33 |
| VOC | n-Butane (VOC Surrogate) | 81 | 17 |

## Fuel Additive and Dye Potential HAP Emissions

**Temperature Data**

| | | | |
|---|---|---|---|
| Daily Average Ambient Temperature | 514.82 | °R | *AP-42 Table 7.1-7 (11/06) for Huntington, WV* |
| Liquid Bulk Temperature | 514.84 | °R | *AP-42 Table 7.1-7 (11/06) for Huntington, WV* |
| Tank Paint Solar Absorptance | 0.17 | dimensionless | *AP-42 Table 7.1-6 (11/06) for white paint in good condition* |
| Daily Total Solar Insolation Factor | 1176 | $BTU/ft^2$-d | *AP-42 Table 7.1-7 (11/06) for Huntington, WV* |
| Daily Average Liquid Surface Temperature | 13.74 | °C | *Equation 1-26 in AP-42 7.1.3 (11/06)* |

**Unisol® Liquid Red BK-50 Properties**

| | | | |
|---|---|---|---|
| Molecular Weight of Liquid Stock | 162 | lb/lb-mol | *TankESP* |
| Molecular Weight of Vapor Stock | 130 | lb/lb-mol | *TankESP* |
| Vapor Pressure at 13.74 °C | 0.01 | psia | *TankESP* |

**HiTEC® 4142M Fuel Additive Properties**

| | | | |
|---|---|---|---|
| Molecular Weight of Liquid Stock | 162 | lb/lb-mol | *TankESP* |
| Molecular Weight of Vapor Stock | 130 | lb/lb-mol | *TankESP* |
| Vapor Pressure at 13.74 °C | 0.04 | psia | *TankESP* |

**BioDiesel (B100) Virgin Soybean Oil**

| | | | |
|---|---|---|---|
| Molecular Weight of Liquid Stock | 292.5 | lb/lb-mol | *TankESP* |
| Molecular Weight of Vapor Stock | 292.5 | lb/lb-mol | *TankESP* |
| Vapor Pressure at 13.74 °C | 0.05 | psia | *TankESP* |

| Material | Component | A[a] | B[a] | C[a] | Vapor Pressure (mmHg)[b] | Vapor Pressure ($psi_a$)[c] | MW (lb/lb-mole)[d] | Liquid Mole Fraction[e] | Partial Pressure ($psi_a$)[f] | Vapor Mole Fraction[g] | Vapor Weight Fraction[h] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unisol® Liquid Red BK-50 Calculation | Xylene | 7.009 | 1426.266 | 215.11 | 5.981519392 | 0.115662973 | 106.16 | 0.46 | 0.05 | 6.94 | 5.67 |
| | Ethylbenzene | 6.975 | 1424.255 | 213.21 | 5.006085026 | 0.096801271 | 106.17 | 0.15 | 0.01 | 1.94 | 1.58 |
| HiTEC® 4142M Fuel Additive Calculation | Xylene | 7.009 | 1426.266 | 215.11 | 5.981519392 | 0.115662973 | 106.16 | 0.07 | 0.009 | 0.19 | 0.16 |
| | Cumene | 6.93666 | 1460.793 | 207.78 | 2.19985913 | 0.042538063 | 120.19 | 0.05 | 0.002 | 0.05 | 0.05 |

*[a] AP-42 Table 7.1-5 (11/06)*
*[b] Vapor Pressure (mmHg) = 10^ [A-(B/($T_{LA}$ (°C)+C))]*
*[c] Vapor Pressure ($psi_a$) = Vapor Pressure (mmHg)/51.7149*
*[d] NIST*
*[e] Liquid Mole Fraction = Weight Fraction of Component * Molecular Weight of Liquid Stock (lb/lb-mol) / Molecular Weight of Component (lb/lb-mol)*
*[f] Partial Pressure ($psi_a$) = Vapor Pressure of Component ($psi_a$) * Liquid Mole Fraction*
*[g] Vapor Mole Fraction = Partial Pressure ($psi_a$) / Vapor Pressure of Component ($psi_a$)*
*[h] Vapor Weight Fraction = Vapor Mole Fraction * Molecular Weight of Component (lb/lb-mol) / Molecular Weight of Liquid Stock (lb/lb-mol)*

**HAP Emissions**

| Tank | VOC (tpy) | Material Used | Component | Liquid Weight Fraction[i] | Emission Rate (tpy)[j,k] |
|---|---|---|---|---|---|
| Tank 300 | 1.20E-03 | Unisol® Liquid Red BK-50 | Xylene | 0.30 | 9.36E-04 |
| | | | Ethylbenzene | 0.10 | 2.61E-04 |
| Tank 301 | 7.21E-03 | HiTEC® 4142M Fuel Additive | Xylene | 0.05 | 1.13E-03 |
| | | | Cumene | 0.05 | 3.35E-04 |
| RA-1-302 | 9.77E-04 | Unisol® Liquid Red BK-50 | Xylene | 0.30 | 7.64E-04 |
| | | | Ethylbenzene | 0.10 | 2.13E-04 |

*[i] SDS provided by T. Mang in 7/16 email*
*[j] Emission Rate (tpy) = VOC (tpy) * Vapor Weight Fraction; applicable to tanks storing HiTEC® 4142M Fuel Additive*
*[k] Emission Rate (tpy) = VOC (tpy) * Vapor Weight Fraction / Sum of all Components Vapor Weight Fractions; applicable to tanks storing Unisol® Liquid Red BK-50.*
*This methodology was employed for Unisol® because the Antoine Equation predicts a higher partial pressure for xylene and ethylbenzene than Unisol®'s estimated total vapor pressure*

## Emissions - Floating Roof Landing Loss

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 272 |
| TANK NUMBER: | 52-272 |
| SELECT TANK TYPE: | ◉ IFR Tank ○ EFR Tank ○ Drain Dry Tank |
| TANK DIAMETER (feet): | 85.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | ◉ Yes ○ No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 36,884.26 | 36,884.26 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

**(VOC Emissions in Lbs)** — **Actual**

| | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 695.50 | **695.50** |
| Cleaning Losses (lbs per episode) | 2,086.04 | **2,086.04** |
| Filling Losses (lbs per episode) | 521.51 | **521.51** |
| **Total Emissions (lbs per episode):** | 3,303.05 | **3,303.05** |

**Emissions - Floating Roof Landing Loss**

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 271 |
| TANK NUMBER: | 52-271 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 85.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 36,884.26 | 36,884.26 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

**Report Summary**

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 695.50 | 695.50 |
| Cleaning Losses (lbs per episode) | 2,086.04 | 2,086.04 |
| Filling Losses (lbs per episode) | 521.51 | 521.51 |
| **Total Emissions (lbs per episode):** | 3,303.05 | 3,303.05 |

## Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 270 |
| TANK NUMBER: | 52-270 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 85.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 36,884.26 | 36,884.26 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

**(VOC Emissions in Lbs)** **Actual**

| | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 695.50 | **695.50** |
| Cleaning Losses (lbs per episode) | 2,086.04 | **2,086.04** |
| Filling Losses (lbs per episode) | 521.51 | **521.51** |
| **Total Emissions (lbs per episode):** | 3,303.05 | **3,303.05** |

# Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 268 |
| TANK NUMBER: | 33-268 |
| SELECT TANK TYPE: | ◉ IFR Tank ○ EFR Tank ○ Drain Dry Tank |
| TANK DIAMETER (feet): | 80.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 7.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | ◉ Yes ○ No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 37,699.11 | 37,699.11 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 710.86 | **710.86** |
| Cleaning Losses (lbs per episode) | 2,132.13 | **2,132.13** |
| Filling Losses (lbs per episode) | 533.03 | **533.03** |
| **Total Emissions (lbs per episode):** | 3,376.02 | **3,376.02** |

# Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 267 |
| TANK NUMBER: | 33-267 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 80.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 7.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 37,699.11 | 37,699.11 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 710.86 | **710.86** |
| Cleaning Losses (lbs per episode) | 2,132.13 | **2,132.13** |
| Filling Losses (lbs per episode) | 533.03 | **533.03** |
| **Total Emissions (lbs per episode):** | 3,376.02 | **3,376.02** |

# Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 266 |
| TANK NUMBER: | 33-266 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 80.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 7.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 37,699.11 | 37,699.11 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

| (VOC Emissions in Lbs) | | Actual |
|---|---|---|
| | *One-Day Estimate* | Actual |
| **IFRT with liquid heel - # Days:** | *1* | **1.00** |
| Breathing Losses (lbs per episode) | *710.86* | **710.86** |
| Cleaning Losses (lbs per episode) | *2,132.13* | **2,132.13** |
| Filling Losses (lbs per episode) | *533.03* | **533.03** |
| **Total Emissions (lbs per episode):** | *3,376.02* | **3,376.02** |

## Emissions - Floating Roof Landing Loss

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 265 |
| TANK NUMBER: | 25-265 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 70.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.83 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 26,284.92 | 26,284.92 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | *1* | **1.00** |
| Breathing Losses (lbs per episode) | *495.63* | **495.63** |
| Cleaning Losses (lbs per episode) | *1,486.58* | **1,486.58** |
| Filling Losses (lbs per episode) | *371.64* | **371.64** |
| **Total Emissions (lbs per episode):** | ***2,353.86*** | **2,353.86** |

## Emissions - Floating Roof Landing Loss

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 264 |
| TANK NUMBER: | 72-264 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 110.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 7.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 71,274.88 | 71,274.88 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

(VOC Emissions in Lbs) — **Actual**

| | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | **1.00** |
| Breathing Losses (lbs per episode) | 1,343.97 | **1,343.97** |
| Cleaning Losses (lbs per episode) | 4,031.05 | **4,031.05** |
| Filling Losses (lbs per episode) | 1,007.76 | **1,007.76** |
| **Total Emissions (lbs per episode):** | 6,382.78 | **6,382.78** |

# Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 260 |
| TANK NUMBER: | 96-260 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 120.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 73,513.27 | 73,513.27 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | *1* | **1.00** |
| Breathing Losses (lbs per episode) | *1,386.18* | **1,386.18** |
| Cleaning Losses (lbs per episode) | *4,157.64* | **4,157.64** |
| Filling Losses (lbs per episode) | *1,039.41* | **1,039.41** |
| **Total Emissions (lbs per episode):** | ***6,583.23*** | **6,583.23** |

# Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 259 |
| TANK NUMBER: | 96-259 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 120.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 73,513.27 | 73,513.27 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | *1* | **1.00** |
| Breathing Losses (lbs per episode) | *1,386.18* | **1,386.18** |
| Cleaning Losses (lbs per episode) | *4,157.64* | **4,157.64** |
| Filling Losses (lbs per episode) | *1,039.41* | **1,039.41** |
| **Total Emissions (lbs per episode):** | ***6,583.23*** | **6,583.23** |

## Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 258 |
| TANK NUMBER: | 96-258 |
| SELECT TANK TYPE: | (•) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 120.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (•) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 73,513.27 | 73,513.27 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

(VOC Emissions in Lbs) — Actual

| | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 1,386.18 | **1,386.18** |
| Cleaning Losses (lbs per episode) | 4,157.64 | **4,157.64** |
| Filling Losses (lbs per episode) | 1,039.41 | **1,039.41** |
| **Total Emissions (lbs per episode):** | 6,583.23 | **6,583.23** |

## Emissions - Floating Roof Landing Loss



| | |
|---|---|
| EPA EUID: | Tank 257 |
| TANK NUMBER: | 96-257 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 120.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.50 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 73,513.27 | 73,513.27 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | *1* | **1.00** |
| Breathing Losses (lbs per episode) | *1,386.18* | **1,386.18** |
| Cleaning Losses (lbs per episode) | *4,157.64* | **4,157.64** |
| Filling Losses (lbs per episode) | *1,039.41* | **1,039.41** |
| **Total Emissions (lbs per episode):** | ***6,583.23*** | **6,583.23** |

# Emissions - Floating Roof Landing Loss

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 256 |
| TANK NUMBER: | WA-49-256 |
| SELECT TANK TYPE: | ○ IFR Tank ● EFR Tank ○ Drain Dry Tank |
| TANK DIAMETER (feet): | 90.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 7.25 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 10 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | ● Yes ○ No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 10 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 46,122.51 | 46,122.51 |
| RVP (psia): | 10.00 | 10.00 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.72 | 11.72 |
| Constant B: | 5,237.27 | 5,237.27 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 6.20 | 6.20 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.141 | 0.141 |
| Vapor Molecular Weight (lb/lb-mole): | 66.00 | 66.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.196 | 0.196 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

## Report Summary

(VOC Emissions in Lbs) — Actual

| | One-Day Estimate | Actual |
|---|---|---|
| **EFRT with liquid heel - # Days:** | 1 | **1.00** |
| Breathing Losses (lbs per episode) | *477.05* | 477.05 |
| *S x Csf: (0.58)* | *0.58* | *0.58* |
| Cleaning Losses (lbs per episode) | *1,932.02* | 1,932.02 |
| Filling Losses (lbs per episode) | *500.62* | 500.62 |
| **Total Emissions (lbs per episode):** | ***2,909.70*** | **2,909.70** |

## Emissions - Floating Roof Landing Loss

Marathon Petroleum Company LP

| | |
|---|---|
| EPA EUID: | Tank 253 |
| TANK NUMBER: | 51-253 |
| SELECT TANK TYPE: | (●) IFR Tank ( ) EFR Tank ( ) Drain Dry Tank |
| TANK DIAMETER (feet): | 90.00 |
| TANK COLOR: | White / White |
| TERMINAL & MONTH OF LANDING EPISODE: | KENOVA, WV Sep |
| HEIGHT OF THE VAPOR SPACE OR LEGS (feet): | 6.03 |
| FULL OR PARTIAL HEEL: | Full |
| ORIGINAL STORED LIQUID: | Gasoline RVP 13.5 |
| HOURS IDLE PRIOR TO REFILL or CLEANING: | 24 |
| WAS TANK CLEANED? | (●) Yes ( ) No |
| TERMINAL & MONTH OF REFLOATING: | KENOVA, WV Sep |
| NEW STORED LIQUID: | Gasoline RVP 13.5 |

| | Values for Original Liquid | Values for New Liquid |
|---|---|---|
| Volume of vapor space ($ft^3$): | 38,361.20 | 38,361.20 |
| RVP (psia): | 13.50 | 13.50 |
| Tank Paint Solar Absorptance: | 0.17 | 0.17 |
| Daily Total Solar Insolation (BTU-$ft^2$/day): | 1,371.24 | 1,371.24 |
| Atmospheric Pressure (psia): | 14.3260 | 14.3260 |
| Daily Maximum Air Temperature ($^oF$): | 78.00 | 78.00 |
| Daily Minimum Air Temperature ($^oF$): | 57.10 | 57.10 |
| S (ASTM): | 3.00 | 3.00 |
| Constant A: | 11.63 | 11.63 |
| Constant B: | 5,015.72 | 5,015.72 |
| Constant C: | N/A | N/A |
| Daily Average Ambient Temperature ($^oR$): | 527.22 | 527.22 |
| Liquid Bulk Temperature ($^oR$): | 527.24 | 527.24 |
| Daily Average Liqud Surface Temperature ($^oR$): | 529.07 | 529.07 |
| Daily Average Liqud Surface Temperature ($^oC$): | N/A | N/A |
| TVP (psia): | 8.60 | 8.60 |
| Liquid Density (Lb/gal): | 5.60 | 5.60 |
| Vapor Pressure Function (psia): | 0.225 | 0.225 |
| Vapor Molecular Weight (lb/lb-mole): | 62.00 | 62.00 |
| Ideal Gas Constant: | 10.73 | 10.73 |
| Daily ambient temperature range ($^oR$): | 20.90 | 20.90 |
| Daily vapor temperature range ($^oR$): | 21.58 | 21.58 |
| Vapor Space Expansion Factor: | 0.333 | 0.333 |
| Vented vapor saturation factor: | 0.600 | 0.600 |
| Total saturation factor (IFR & EFR): | 0.60 | 0.60 |
| Total saturation factor (Drain Dry): | 0.15 | 0.15 |

### Report Summary

| (VOC Emissions in Lbs) | One-Day Estimate | Actual |
|---|---|---|
| **IFRT with liquid heel - # Days:** | 1 | 1.00 |
| Breathing Losses (lbs per episode) | 723.35 | **723.35** |
| Cleaning Losses (lbs per episode) | 2,169.57 | **2,169.57** |
| Filling Losses (lbs per episode) | 542.39 | **542.39** |
| **Total Emissions (lbs per episode):** | 3,435.31 | **3,435.31** |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks** 

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **54.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0476** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00252** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **69.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.601** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V =$ 15.54641 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 57.98 deg F Pvx = 0.054 psia

Tln = 50.20 deg F Pvn = 0.042 psia

$\Delta P_V =$ **0.0119676** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0268961**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S =$ **0.932748**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **128.42** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,100.84** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,229.27** | lb per month | AP-42 eqn 1-1 |
| | **0.6** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **55.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0503** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00266** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **76.5** | turnovers per year |
| Turnover Factor, $K_N$: | **0.559** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 60.09 deg F Pvx = 0.058 psia

Tln = 51.54 deg F Pvn = 0.044 psia

$\Delta P_V$ = **0.013791** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0299455**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053 P H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9291852**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **135.53** lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,078.62** lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **1,214.15** lb per | month | AP-42 eqn 1-1 |
| | **0.6** tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, ΔTa: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **61.0** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0593** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00310** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **69.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.601** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 66.19 deg F — Pvx = 0.070 psia

Tln = 55.84 deg F — Pvn = 0.050 psia

$\Delta P_V$ = **0.0191383** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0369088**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9176041**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **213.04** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,352.75** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **1,565.79** lb per month | | AP-42 eqn 1-1 |
| | **0.8** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **65.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0682** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00354** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **71.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.587** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 71.49 deg F — Pvx = 0.081 psia

Tln = 59.62 deg F — Pvn = 0.057 psia

$\Delta P_V$ = **0.0246362** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0427267**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9064236**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **268.71** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,505.87** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **1,774.58** lb per month | | AP-42 eqn 1-1 |
| | **0.9** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **69.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0771** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00397** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **129,300** | bbl per | month |
| Days this Period: | **31** | days | |
| Turnover Rate: | **69.1** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.601** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 75.87 deg F — Pvx = 0.092 psia

Tln = 63.44 deg F — Pvn = 0.064 psia

$\Delta P_V$ = **0.0285588** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.044775**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.8954558**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **322.56** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,730.12** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **2,052.69** | lb per | month | AP-42 eqn 1-1 |
| | **1.0** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **72.9** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0849** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00434** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **71.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.587** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 78.96 deg F — Pvx = 0.101 psia

Tln = 66.90 deg F — Pvn = 0.071 psia

$\Delta P_V$ = **0.0299705** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0431695**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.8860782**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **325.94** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,849.41** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **2,175.36** lb per month | | AP-42 eqn 1-1 |
| | **1.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **74.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0889** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00453** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **69.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.601** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 80.19 deg F — Pvx = 0.105 psia

Tln = 68.85 deg F — Pvn = 0.075 psia

$\Delta P_V$ = **0.0292425** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0402642**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.8813372**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **326.24** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,977.07** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **2,303.31** | lb per month | AP-42 eqn 1-1 |
| | **1.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **73.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0870** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00444** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **129,300** | bbl per | month |
| Days this Period: | **31** | days | |
| Turnover Rate: | **69.1** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.601** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V =$ 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.19 deg F — Pvx = 0.102 psia

Tln = 68.34 deg F — Pvn = 0.074 psia

$\Delta P_V =$ **0.0275101** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0384173**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S =$ **0.8836067**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **August 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **305.76** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,937.01** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **2,242.77** | lb per | month | AP-42 eqn 1-1 |
| | **1.1** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:
- Avg Atmos Pressure, Pa: **14.326** psia
- Avg Ambient Temp, Taa: **67.55** degrees F
- Avg Daily Temp Range, $\Delta$Ta: **20.9** degrees F
- Avg Daily Solar Insolation, I: **1371.24094** Btu / ft$^2$ day

Tank Data:
- Tank Type: **FixedRoof**
- Average alpha: **0.17**
- Tank Diameter: **54** ft
- Tank Height: **56** ft
- Maximum Fill Height: **55** ft
- Minimum Liquid Level: **1** ft
- Net Working Height: **54** ft
- Fixed Roof Type: **column-supported(cone)**
- Average outage, $H_{VO}$: **28.5625** ft
- Max Vent Setting: **0.03** psig
- Min Vent Setting: **-0.03** psig

shell color: **white paint**
shell condition: **good**
shell alpha: **0.17**
roof color: **white paint**
roof condition: **good**
roof alpha: **0.17**
effective roof height: **0.5625** ft
Hvo: **28.5625** ft

Service Data:
- Service (stored liquid): **B100 Virgin Soybean Oil**
- Product Factor, $K_P$: **1**
- Reid VaporPressure: psi (if specified)
- ASTM Distillation Slope: (if specified)
- Molecular Weight, $M_V$: **292.2** lb/lb-mol
- Liquid Bulk Temp, Tb: **70.0** degrees F
- Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
- Liquid Bulk Temp Basis? given by user
- Liquid Surface Temp, T: **70.8** degrees F per AP-42 equation 1-26
- True Vapor Pressure, P: **0.0797** psia per AP-42 equation 1-25
- Stock Vapor Density, $W_V$: **0.00409** lb/ft$^3$ per AP-42 equation 1-21

Vapor Pressure Constants:
A: **5.51**
B: **1038.25**
C: **190.57**

Heating Cycles:
- Max Liquid Bulk Temp: degrees F
- Min Liquid Bulk Temp: degrees F
- Heating cycle frequency: days

Operational Data:
- Throughput: **129,300** bbl per month
- Days this Period: **30** days
- Turnover Rate: **71.4** turnovers per year
- Turnover Factor, $K_N$: **0.587**

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 76.16 deg F Pvx = 0.093 psia

Tln = 65.37 deg F Pvn = 0.068 psia

$\Delta P_V$ = **0.0254345** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0382482**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.8923482**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **274.01** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,742.44** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **2,016.45** | lb per | month | AP-42 eqn 1-1 |
| | **1.0** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, ΔTa: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **65.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0676** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00351** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **69.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.601** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 70.52 deg F Pvx = 0.079 psia
Tln = 60.05 deg F Pvn = 0.058 psia

$\Delta P_V$ = **0.0215766** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0372154**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9071257**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **240.16** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,529.86** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,770.01** | lb per month | AP-42 eqn 1-1 |
| | **0.9** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **60.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0585** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00306** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **129,300** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **71.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.587** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 64.75 deg F Pvx = 0.067 psia
Tln = 56.34 deg F Pvn = 0.051 psia

$\Delta P_V$ = **0.0153538** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0292213**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9187037**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **161.19** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,303.20** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,464.40** | lb per month | AP-42 eqn 1-1 |
| | **0.7** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **23-273**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **54** | ft | shell alpha: | **0.17** |
| Tank Height: | **56** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **55** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **54** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.5625** ft |
| Average outage, $H_{VO}$: | **28.5625** | ft | Hvo: | **28.5625** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **B100 Virgin Soybean Oil** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **5.51** |
| ASTM Distillation Slope: | | | (if specified) | B: **1038.25** |
| Molecular Weight, $M_V$: | **292.2** | lb/lb-mol | | C: **190.57** |
| Liquid Bulk Temp, Tb: | **70.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | given by user | | | |
| Liquid Surface Temp, T: | **56.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0508** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00268** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **129,300** | bbl per | month |
| Days this Period: | **31** | days | |
| Turnover Rate: | **69.1** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.601** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 59.79 deg F Pvx = 0.057 psia

Tln = 52.45 deg F Pvn = 0.045 psia

$\Delta P_V$ = **0.0119188** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0250744**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9285416**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **126.71** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,170.37** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **1,297.08** | lb per | month | AP-42 eqn 1-1 |
| | **0.6** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **FixedRoof** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **65.83** ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** ft | | |
| Fixed Roof Type: | **column-supported(cone)** | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **32.0** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **32.8** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0032** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00008** lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.004 psia

Tln = 28.91 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0009139** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274434**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9964018**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **4.84** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **53.12** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **57.95** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, ΔTa: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0036** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **196.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.320** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F  Pvx = 0.004 psia
Tln = 32.03 deg F  Pvn = 0.003 psia

$\Delta P_V$ = **0.0011279** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303768**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9959098**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **5.46** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **57.06** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **62.51** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F  Pvx = 0.006 psia

Tln = 42.41 deg F  Pvn = 0.005 psia

$\Delta P_V$ = **0.0019502** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0367723**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9939078**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **10.65** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **87.53** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **98.18** lb per month | | AP-42 eqn 1-1 |
| | **0.0** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0075** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **182.9** | turnovers per year |
| Turnover Factor, $K_N$: | **0.331** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F; Pvx = 0.009 psia

Tln = 51.40 deg F; Pvn = 0.006 psia

$\Delta P_V$ = **0.0030026** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419452**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9915284**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **16.04** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **117.76** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **133.80** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0101** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00023** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.012 psia

Tln = 59.98 deg F — Pvn = 0.008 psia

$\Delta P_V$ = **0.004067** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0433837**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9886989**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **22.49** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **157.45** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **179.94** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **FixedRoof** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **65.83** | ft |
| Tank Height: | **41.42** | ft |
| Maximum Fill Height: | **40.42** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **39.42** | ft |
| Fixed Roof Type: | **column-supported(cone)** | |
| Average outage, $H_{VO}$: | **21.3957292** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0.68573** ft |
| Hvo: | **21.3957** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | | psi | (if specified) |
| ASTM Distillation Slope: | | | (if specified) |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0127** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00029** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A: **12.39**
B: **8933**
C: 

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **182.9** | turnovers per year |
| Turnover Factor, $K_N$: | **0.331** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 0.015 psia

Tln = 67.39 deg F — Pvn = 0.010 psia

$\Delta P_V$ = **0.0048284** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0413823**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9858154**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **25.70** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **192.34** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **218.04** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00032** | lb/ft$^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F — Pvx = 0.017 psia

Tln = 71.47 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0050224** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0383764**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9840988**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **27.42** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **218.04** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **245.46** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0136** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00031** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.016 psia
Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0046296** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366805**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9847649**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **25.17** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **209.31** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **234.48** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0112** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00026** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **182.9** | turnovers per year |
| Turnover Factor, $K_N$: | **0.331** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 74.80 deg F Pvx = 0.013 psia

Tln = 64.01 deg F Pvn = 0.009 psia

$\Delta P_V$ = **0.0038591** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368572**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9874886**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **20.34** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **170.65** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **190.99** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta Ta$: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0076** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.009 psia

Tln = 52.27 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0026605** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365054**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9914793**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **14.50** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **120.37** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **134.87** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **182.9** | turnovers per year |
| Turnover Factor, $K_N$: | **0.331** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 51.58 deg F Pvx = 0.006 psia

Tln = 43.16 deg F Pvn = 0.005 psia

$\Delta P_V$ = **0.0015723** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0291112**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9939535**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.10** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **85.49** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **93.60** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-202**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **65.83** | ft | shell alpha: | **0.17** |
| Tank Height: | **41.42** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **40.42** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **39.42** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **0.68573** ft |
| Average outage, $H_{VO}$: | **21.3957292** | ft | Hvo: | **21.3957** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0038** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **359,310** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **177.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.336** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0010066** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253848**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9957201**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **5.27** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **62.62** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **67.89** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **114.72** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **372.97** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-265**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | |
|---|---|---|---|
| | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | roof color: | **white paint** |
| Average alpha: | **0.17** | roof condition: | **good** |
| Tank Diameter, D: | **70** ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **42** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **113.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **371.41** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-265**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **42** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **166.94** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **425.19** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **176.68** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **434.92** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **126.08** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **384.33** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-265**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **145.38** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **403.63** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **164.62** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **422.87** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **159.03** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **417.28** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **244.86** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **503.11** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-265**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **217.23** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **475.48** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **25-265**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **160.65** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **418.89** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **25-265**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **70** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **42** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **8** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **150** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **200** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **129.31** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **258.25** lb per month

**Total Emissions:** **387.56** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-266**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **106.59** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **332.16** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **105.14** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **330.71** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **155.10** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **380.67** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **164.15** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **389.72** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **117.14** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **342.71** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **135.08** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **360.64** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks** 

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-266**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **152.95** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **378.52** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-266**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

| | | | |
|---|---|---|---|
| **Standing Storage Loss:** | **147.75** | lb per month | |

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

| | | | |
|---|---|---|---|
| **Withdrawal Loss:** | **225.57** | lb per month | |
| **Total Emissions:** | **373.32** | lb per month | per AP-42 equation 2-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **227.50** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **453.07** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-266**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **201.83** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **427.40** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **149.26** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **374.82** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-266**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **138** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **120.14** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **345.71** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **116.75** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **342.32** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **115.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **340.74** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **169.90** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **395.47** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **179.81** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **405.38** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **128.31** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **353.88** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **147.96** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **373.53** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **167.54** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **393.11** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **161.85** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **387.42** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **249.20** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **474.77** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-267**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **221.08** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **446.65** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **163.49** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **389.06** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-267**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **22** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **134** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **204** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **131.60** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **357.17** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **107.73** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **333.30** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** lb-mol/yr | |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **106.27** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **331.84** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **156.77** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **382.34** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data: shell alpha: **0.17**

| | | | | |
|---|---|---|---|---|
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **165.91** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **391.48** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / ft$^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb V$^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb V$^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) D$^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) D$^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **118.40** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **343.97** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **136.53** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **362.10** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **154.60** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **380.16** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **149.34** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **374.91** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **229.95** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **455.51** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **204.00** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **429.57** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **33-268**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **150.86** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **376.43** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **33-268**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **80** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **48** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **140** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **188** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,250,000** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **121.44** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **225.57** lb per month

**Total Emissions:** **347.00** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | |
|---|---|---|---|
| | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | roof color: | **white paint** |
| Average alpha: | **0.17** | roof condition: | **good** |
| Tank Diameter, D: | **90** ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **106.34** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **245.86** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **54** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **104.90** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **244.42** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **51-253**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **154.75** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **294.27** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **163.77** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **303.29** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **116.87** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **256.39** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **134.76** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **274.28** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

| | | |
|---|---|---|
| Rim Seal Emission Factor (Fr): | **54** | lb-mol/yr |

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

| | | | |
|---|---|---|---|
| Deck Seam Emission Factor (Fd): | **0** | lb-mol/yr | |

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **152.60** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **292.12** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **147.41** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **286.93** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **226.98** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **366.50** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **201.36** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **340.88** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **51-253**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **54** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **148.91** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **288.43** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **51-253**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **54** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **25** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **107** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **186** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,567,803** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **119.87** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **139.52** lb per month

**Total Emissions:** **259.39** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **340.74** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **626.53** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **336.12** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **621.91** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **495.85** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **781.64** lb per month — per AP-42 equation 2-1

**0.4** tons per month

## Sample Calculation of Estimated Emissions - Floating-Roof Tanks



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **524.76** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **810.55** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **374.48** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **660.27** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **431.82** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **717.61** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **488.97** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **774.76** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **472.35** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **758.14** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **727.29** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **1,013.08** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **645.21** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **931.00** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-270**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **477.15** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **762.94** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-270**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |
| Avg Wind Speed, V: | **7.4** | mph |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |

Tank Data:

Tank Type: **IFRT**

Average alpha: **0.17**

Tank Diameter, D: **85** ft

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **81** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **595** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **384.08** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **669.87** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **343.38** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **629.17** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **338.72** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **624.51** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-271**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **499.68** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **785.47** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-271**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **528.82** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **814.61** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **377.37** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **663.16** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **435.16** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **720.95** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **492.75** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **778.54** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **476.00** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **761.79** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **732.91** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **1,018.70** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-271**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **650.20** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **935.99** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **480.84** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **766.63** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-271**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **387.05** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.79** lb per month

**Total Emissions:** **672.84** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-272**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **343.38** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **629.07** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-272**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **338.72** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **624.41** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **499.68** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **785.37** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-272**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **528.82** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **814.51** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-272**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **377.37** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **663.06** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **435.16** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **720.85** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **492.75** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **778.44** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **476.00** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **761.69** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **732.91** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **1,018.60** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |
| | | | shell alpha: | **0.17** |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **IFRT** | roof color: | **white paint** |
| Average alpha: | **0.17** | roof condition: | **good** |
| Tank Diameter, D: | **85** ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **650.20** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **935.89** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **52-272**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **480.84** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **766.53** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **52-272**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **85** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **493** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **599** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,041,667** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **387.05** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **285.69** lb per month

**Total Emissions:** **672.74** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **203.39** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **338.15** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **200.64** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **335.39** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **295.98** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **430.73** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **72-264**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **313.24** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **447.99** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **223.53** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **358.28** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **72-264**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **257.76** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **392.51** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **291.87** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **426.62** lb per month — per AP-42 equation 2-1
**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **281.95** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **416.71** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **72-264**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

Avg Atmos Pressure, Pa: **14.326** psia
Avg Ambient Temp, Taa: **67.55** degrees F
Avg Daily Solar Insolation, I: **1371.24094** Btu / $ft^2$ day
Avg Wind Speed, V: **5.3** mph

shell color: **white paint**
shell condition: **good**
shell alpha: **0.17**
roof color: **white paint**
roof condition: **good**
roof alpha: **0.17**

Tank Data:

Tank Type: **IFRT**
Average alpha: **0.17**
Tank Diameter, D: **110** ft
Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

Guidepole Emission Factor (Ffgp): **21** lb-mol/yr
Deck Fittings Emission Factor (Ffi-n): **268** lb-mol/yr (all deck fittings other than the guidepole)
Total Emission Factors (Fr + Fd + Ff): **355** lb-mol/yr
Number of columns, Nc: **7**
Effective column diameter, Fc: **1** feet

Service Data:

Service (stored liquid): **Gasoline RVP_X**
Product Factor, $K_C$: **1**
Reid VaporPressure: **13.5** psi (if specified)
ASTM Distillation Slope: **3** (if specified)
Molecular Weight, $M_V$: **66** lb/lb-mol given
Liquid Bulk Temp, Tb: **67.6** degrees F
Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
Liquid Bulk Temp Basis? calculated from ambient, per AP-42 equation 1-28
Liquid Surface Temp, Tla: **69.4** degrees F per AP-42 equation 1-26
True Vapor Pressure, Pva: **8.601** psia per AP-42 equation 1-24

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

Vapor Pressure Function, P*: **0.2254** dimensionless per AP-42 equation 2-3
Liquid density, Wl: **5.6** lb/gal
Clingage factor, Cs: **0.0015** bbl per 1000 sq.ft.

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9
**Standing Storage Loss:** **434.13** lb per month
Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4
**Withdrawal Loss:** **134.75** lb per month
**Total Emissions:** **568.88** lb per month — per AP-42 equation 2-1
**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **72-264**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr |
| Number of columns, Nc: | **7** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **385.14** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **519.89** lb per month — per AP-42 equation 2-1

**0.3** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **72-264**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **284.82** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **419.57** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **72-264**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **110** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **66** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **268** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **355** | lb-mol/yr | |
| Number of columns, Nc: | **7** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **1,759,310** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **229.27** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **134.75** lb per month

**Total Emissions:** **364.02** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **90-258**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **704.75** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **984.44** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **695.20** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **974.88** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **90-258**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,025.56** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,305.24** lb per month — per AP-42 equation 2-1

**0.7** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,085.36** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,365.04** lb per month — per AP-42 equation 2-1

**0.7** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **774.53** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,054.21** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **893.13** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,172.81** lb per month per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **90-258**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,011.32** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,291.01** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **90-258**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **976.96** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,256.64** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,504.24** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,783.93** lb per month — per AP-42 equation 2-1

**0.9** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,334.49** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,614.17** lb per month — per AP-42 equation 2-1

**0.8** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **90-258**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |
| | | | shell alpha: | **0.17** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **986.89** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,266.57** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **90-258**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **43** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **491** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,230** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **4,055,832** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **794.39** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **279.68** lb per month

**Total Emissions:** **1,074.08** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **486.77** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **732.97** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | |
|---|---|---|---|
| | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | roof color: | **white paint** |
| Average alpha: | **0.17** | roof condition: | **good** |
| Tank Diameter, D: | **120** ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]
Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]
Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **480.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **726.37** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **708.35** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **954.55** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **95-259**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **749.66** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **995.85** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **534.97** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **781.16** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **616.89** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **863.08** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **698.52** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **944.71** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **674.79** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **920.98** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **95-259**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |
| | | | shell alpha: | **0.17** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,038.98** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **1,285.17** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **95-259**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **921.73** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **1,167.93** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **95-259**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **681.64** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **927.84** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **95-259**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **133** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **850** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,698,804** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **548.69** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **246.19** lb per month

**Total Emissions:** **794.88** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-257**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **575.97** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **840.54** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **568.16** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **832.73** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-257**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr |
| Number of columns, Nc: | **8** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **838.15** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,102.72** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **887.02** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,151.60** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **632.99** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **897.57** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **729.92** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **994.50** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **826.52** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,091.09** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **798.43** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,063.01** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: __________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,229.36** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,493.94** lb per month — per AP-42 equation 2-1

**0.7** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |
| | | | shell alpha: | **0.17** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr |
| Number of columns, Nc: | **8** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,090.63** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,355.20** lb per month — per AP-42 equation 2-1

**0.7** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-257**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **806.55** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **1,071.12** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-257**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\, V^n)\, D] \times [P^*\, Mv\, Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\, Mv\, Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\, V^n)\, D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\, Sd)\, D^2] \times [P^*\, Mv\, Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\, Mv\, Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\, Sd)\, D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\, Mv\, Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\, [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\, (Kv\, V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **11** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **298** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **1,005** | lb-mol/yr | |
| Number of columns, Nc: | **8** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,836,718** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **649.23** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **264.57** lb per month

**Total Emissions:** **913.80** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **496.96** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **736.88** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **490.22** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **730.15** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-260**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **723.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **963.10** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-260**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **765.34** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **1,005.27** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | |
|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr |
| Number of columns, Nc: | **1** | |
| Effective column diameter, Fc: | **1** | feet |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **546.16** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **786.08** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

- Avg Atmos Pressure, Pa: **14.326** psia
- Avg Ambient Temp, Taa: **70.85** degrees F
- Avg Daily Solar Insolation, I: **1904.88908** Btu / $ft^2$ day
- Avg Wind Speed, V: **5.7** mph

shell color: **white paint**
shell condition: **good**
shell alpha: **0.17**
roof color: **white paint**
roof condition: **good**
roof alpha: **0.17**

Tank Data:

- Tank Type: **IFRT**
- Average alpha: **0.17**
- Tank Diameter, D: **120** ft
- Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

- Guidepole Emission Factor (Ffgp): **21** lb-mol/yr
- Deck Fittings Emission Factor (Ffi-n): **151** lb-mol/yr (all deck fittings other than the guidepole)
- Total Emission Factors (Fr + Fd + Ff): **868** lb-mol/yr
- Number of columns, Nc: **1**
- Effective column diameter, Fc: **1** feet

Service Data:

- Service (stored liquid): **Gasoline RVP_X**
- Product Factor, $K_C$: **1**
- Reid VaporPressure: **9** psi (if specified)
- ASTM Distillation Slope: **3** (if specified)
- Molecular Weight, $M_V$: **66** lb/lb-mol given
- Liquid Bulk Temp, Tb: **70.9** degrees F
- Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
- Liquid Bulk Temp Basis? calculated from ambient, per AP-42 equation 1-28
- Liquid Surface Temp, Tla: **73.4** degrees F — per AP-42 equation 1-26
- True Vapor Pressure, Pva: **5.965** psia — per AP-42 equation 1-24

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$ ]$^2$

- Vapor Pressure Function, P*: **0.1338** dimensionless — per AP-42 equation 2-3
- Liquid density, Wl: **5.6** lb/gal
- Clingage factor, Cs: **0.0015** bbl per 1000 sq.ft.

Operational Data:

- Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **June 2019**

- Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **629.79** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **869.72** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-260**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **713.14** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **953.06** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **688.90** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **928.83** lb per month per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-260**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **1,060.72** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **1,300.65** lb per month — per AP-42 equation 2-1

**0.7** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **96-260**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **941.02** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **1,180.94** lb per month — per AP-42 equation 2-1

**0.6** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with NO Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **695.91** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **935.83** lb per month — per AP-42 equation 2-1

**0.5** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **96-260**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **IFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **120** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with NO Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **696** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **21** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **151** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **868** | lb-mol/yr | |
| Number of columns, Nc: | **1** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **3,613,596** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **560.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **239.92** lb per month

**Total Emissions:** **800.09** lb per month — per AP-42 equation 2-1

**0.4** tons per month

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0032** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00008** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.004 psia

Tln = 28.91 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0009139** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274434**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9957215**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **26.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **307.14** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **333.14** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, ΔTa: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0036** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **233.8** | turnovers per year |
| Turnover Factor, $K_N$: | **0.295** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 40.59 deg F  Pvx = 0.004 psia

Tln = 32.03 deg F  Pvn = 0.003 psia

$\Delta P_V$ = **0.0011279** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303768**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9951369**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **29.34** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **331.38** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **360.73** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F    Pvx = 0.006 psia

Tln = 42.41 deg F    Pvn = 0.005 psia

$\Delta P_V$ = **0.0019502** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0367723**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9927594**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **57.25** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **506.13** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **563.38** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, ΔTa: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0075** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **218.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.304** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F — Pvx = 0.009 psia

Tln = 51.40 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0030026** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419452**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.989936**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **86.19** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **681.91** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **768.10** | lb per month | AP-42 eqn 1-1 |
| | **0.4** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, ΔTa: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0101** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00023** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.012 psia
Tln = 59.98 deg F — Pvn = 0.008 psia

$\Delta P_V$ = **0.004067** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0433837**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9865818**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **120.75** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **910.42** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,031.17** | lb per month | AP-42 eqn 1-1 |
| | **0.5** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0127** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00029** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **218.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.304** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 0.015 psia

Tln = 67.39 deg F — Pvn = 0.010 psia

$\Delta P_V$ = **0.0048284** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0413823**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9831673**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **137.93** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,113.75** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **1,251.68** lb per month | | AP-42 eqn 1-1 |
| | **0.6** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00032** | $lb/ft^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F — Pvx = 0.017 psia

Tln = 71.47 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0050224** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0383764**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9811365**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **147.10** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,260.76** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,407.86** | lb per month | AP-42 eqn 1-1 |
| | **0.7** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0136** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00031** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.016 psia

Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0046296** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366805**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9819243**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **135.08** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,210.29** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,345.37** | lb per month | AP-42 eqn 1-1 |
| | **0.7** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, ΔTa: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0112** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00026** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **218.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.304** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 74.80 deg F Pvx = 0.013 psia

Tln = 64.01 deg F Pvn = 0.009 psia

$\Delta P_V$ = **0.0038591** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368572**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9851483**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **109.21** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **988.14** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,097.36** | lb per month | AP-42 eqn 1-1 |
| | **0.5** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0076** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.009 psia

Tln = 52.27 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0026605** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365054**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9898778**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **77.93** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **695.99** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **773.93** | lb per month | AP-42 eqn 1-1 |
| | **0.4** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **218.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.304** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F — Pvx = 0.006 psia

Tln = 43.16 deg F — Pvn = 0.005 psia

$\Delta P_V$ = **0.0015723** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0291112**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9928136**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **43.55** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **495.06** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **538.62** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **123-255**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **140** | ft | shell alpha: | **0.17** |
| Tank Height: | **48** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **47** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **46** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.45833** ft |
| Average outage, $H_{VO}$: | **25.4583333** | ft | Hvo: | **25.4583** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0038** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00009** | lb/$ft^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,261,934** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **211.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.309** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0010066** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253848**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9949116**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **28.34** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **362.07** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **390.40** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0032** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00008** | lb/ft$^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.004 psia

Tln = 28.91 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0009139** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274434**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9955226**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **31.24** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **485.54** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **516.78** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **151-261**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, ΔTa: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0036** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **370.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.248** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 0.004 psia

Tln = 32.03 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0011279** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303768**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9949109**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **35.25** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **529.72** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **564.97** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 0.006 psia

Tln = 42.41 deg F — Pvn = 0.005 psia

$\Delta P_V$ = **0.0019502** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0367723**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9924237**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **68.77** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **800.11** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **868.88** | lb per month | AP-42 eqn 1-1 |
| | **0.4** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0075** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **345.5** | turnovers per year |
| Turnover Factor, $K_N$: | **0.253** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F — Pvx = 0.009 psia

Tln = 51.40 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0030026** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419452**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9894709**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **103.51** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,081.88** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,185.40** | lb per month | AP-42 eqn 1-1 |
| | **0.6** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0101** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00023** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.012 psia

Tln = 59.98 deg F — Pvn = 0.008 psia

$\Delta P_V$ = **0.004067** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0433837**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9859639**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **145.00** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,439.23** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,584.23** | lb per month | AP-42 eqn 1-1 |
| | **0.8** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0127** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00029** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **345.5** | turnovers per year |
| Turnover Factor, $K_N$: | **0.253** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 0.015 psia

Tln = 67.39 deg F — Pvn = 0.010 psia

$\Delta P_V$ = **0.0048284** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0413823**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9823949**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **165.60** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,767.02** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,932.62** | lb per month | AP-42 eqn 1-1 |
| | **1.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00032** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 82.80 deg F Pvx = 0.017 psia

Tln = 71.47 deg F Pvn = 0.012 psia

$\Delta P_V$ = **0.0050224** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0383764**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9802728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **176.59** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,993.07** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **2,169.66** lb per month | | AP-42 eqn 1-1 |
| | **1.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0136** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00031** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.016 psia

Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0046296** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366805**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.981096**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **162.17** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,913.28** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **2,075.45** | lb per month | AP-42 eqn 1-1 |
| | **1.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0112** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00026** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **345.5** | turnovers per year |
| Turnover Factor, $K_N$: | **0.253** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F — Pvx = 0.013 psia

Tln = 64.01 deg F — Pvn = 0.009 psia

$\Delta P_V$ = **0.0038591** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368572**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9844653**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **131.14** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **1,567.74** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **1,698.88** lb per month | | AP-42 eqn 1-1 |
| | **0.8** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0076** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.009 psia

Tln = 52.27 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0026605** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365054**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.98941**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **93.60** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,100.26** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,193.86** | lb per month | AP-42 eqn 1-1 |
| | **0.6** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **345.5** | turnovers per year |
| Turnover Factor, $K_N$: | **0.253** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F — Pvx = 0.006 psia

Tln = 43.16 deg F — Pvn = 0.005 psia

$\Delta P_V$ = **0.0015723** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0291112**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9924805**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **52.32** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **785.44** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **837.76** lb per month | | AP-42 eqn 1-1 |
| | **0.4** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-261**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0038** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,306,081** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **334.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.256** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0010066** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253848**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9946752**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **34.04** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **572.37** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **606.41** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, ΔTa: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0032** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00008** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.004 psia

Tln = 28.91 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0009139** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274434**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9955226**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **31.24** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **491.84** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **523.08** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0036** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **377.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.246** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 0.004 psia

Tln = 32.03 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0011279** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303768**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9949109**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **35.25** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **536.83** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **572.08** | lb per month | AP-42 eqn 1-1 |
| | **0.3** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 0.006 psia

Tln = 42.41 deg F — Pvn = 0.005 psia

$\Delta P_V$ = **0.0019502** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0367723**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9924237**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **68.77** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **810.49** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **879.26** | lb per month | AP-42 eqn 1-1 |
| | **0.4** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, ΔTa: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0075** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **4,392,007** | bbl per | month |
| Days this Period: | **30** | days | |
| Turnover Rate: | **352.4** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.252** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F  Pvx = 0.009 psia
Tln = 51.40 deg F  Pvn = 0.006 psia

$\Delta P_V$ = **0.0030026** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419452**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9894709**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **103.51** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **1,096.08** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **1,199.59** | lb per | month | AP-42 eqn 1-1 |
| | **0.6** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0101** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00023** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.012 psia

Tln = 59.98 deg F — Pvn = 0.008 psia

$\Delta P_V$ = **0.004067** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0433837**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9859639**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **145.00** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,457.90** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,602.90** | lb per month | AP-42 eqn 1-1 |
| | **0.8** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **FixedRoof** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **150** | ft |
| Tank Height: | **50.17** | ft |
| Maximum Fill Height: | **49.17** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **48.17** | ft |
| Fixed Roof Type: | **column-supported(cone)** | |
| Average outage, $H_{VO}$: | **26.6475** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **1.5625** ft |
| Hvo: | **26.6475** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | | psi | (if specified) |
| ASTM Distillation Slope: | | | (if specified) |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0127** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00029** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A: **12.39**
B: **8933**
C:

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **352.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.252** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 79.45 deg F    Pvx = 0.015 psia

Tln = 67.39 deg F    Pvn = 0.010 psia

$\Delta P_V$ = **0.0048284** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0413823**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9823949**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **165.60** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,790.20** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,955.81** | lb per month | AP-42 eqn 1-1 |
| | **1.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00032** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F  Pvx = 0.017 psia

Tln = 71.47 deg F  Pvn = 0.012 psia

$\Delta P_V$ = **0.0050224** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0383764**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9802728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **176.59** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **2,018.92** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **2,195.52** | lb per month | AP-42 eqn 1-1 |
| | **1.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0136** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00031** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.016 psia

Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.0046296** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366805**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.981096**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **162.17** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,938.10** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **2,100.27** | lb per month | AP-42 eqn 1-1 |
| | **1.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0112** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00026** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **352.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.252** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F — Pvx = 0.013 psia
Tln = 64.01 deg F — Pvn = 0.009 psia

$\Delta P_V$ = **0.0038591** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368572**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9844653**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **131.14** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,588.31** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,719.45** | lb per month | AP-42 eqn 1-1 |
| | **0.9** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0076** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/$ft^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **341.0** | turnovers per year |
| Turnover Factor, $K_N$: | **0.255** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.009 psia

Tln = 52.27 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0026605** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365054**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053 P H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.98941**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

| Emissions Estimate for: | **October 2019** | | |
|---|---|---|---|
| Standing Storage Loss: | **93.60** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **1,114.53** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1,208.13** | lb per month | AP-42 eqn 1-1 |
| | **0.6** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00013** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **4,392,007** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **352.4** | turnovers per year |
| Turnover Factor, $K_N$: | **0.252** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V =$ 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F    Pvx = 0.006 psia

Tln = 43.16 deg F    Pvn = 0.005 psia

$\Delta P_V =$ **0.0015723** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0291112**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S =$ **0.9924805**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **52.32** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **795.75** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **848.06** lb per month | | AP-42 eqn 1-1 |
| | **0.4** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **151-262**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **FixedRoof** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **150** | ft | shell alpha: | **0.17** |
| Tank Height: | **50.17** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **49.17** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **48.17** | ft | | |
| Fixed Roof Type: | **column-supported(cone)** | | effective roof height: | **1.5625** ft |
| Average outage, $H_{VO}$: | **26.6475** | ft | Hvo: | **26.6475** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Jet kerosene** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **12.39** |
| ASTM Distillation Slope: | | | (if specified) | B: **8933** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0038** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.00009** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **4,392,007** | bbl per | month |
| Days this Period: | **31** | days | |
| Turnover Rate: | **341.0** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.255** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0010066** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253848**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9946752**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **34.04** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **579.80** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **613.84** | lb per | month | AP-42 eqn 1-1 |
| | **0.3** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0027** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00007** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.003 psia

Tln = 28.91 deg F — Pvn = 0.002 psia

$\Delta P_V$ = **0.0010683** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274543**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9997012**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979099**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.05** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.06** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.666** ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **35.2** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **36.3** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0032** psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00008** lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **35.9** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 40.59 deg F Pvx = 0.004 psia

Tln = 32.03 deg F Pvn = 0.003 psia

$\Delta P_V$ = **0.0013287** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303909**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9996451**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979098**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.02** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.06** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.08** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 0.007 psia
Tln = 42.41 deg F — Pvn = 0.004 psia

$\Delta P_V$ = **0.0022772** psia
$\Delta P_B$ = 0.06 psi; vent setting range
$K_E$ = **0.0367952**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9994155**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting
$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979095**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.04** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.09** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.13** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

- Avg Atmos Pressure, Pa: **14.326** psia
- Avg Ambient Temp, Taa: **55.3** degrees F
- Avg Daily Temp Range, $\Delta$Ta: **23** degrees F
- Avg Daily Solar Insolation, I: **1509.25339** Btu / $ft^2$ day

Tank Data:

- Tank Type: **Horizontal**
- Average alpha: **0.17**
- Tank Diameter: **12.666** ft
- Tank Height: **4.12334** ft
  - Maximum Fill Height: **3.1233395** ft
  - Minimum Liquid Level: **1** ft
  - Net Working Height: **2.1233395** ft
- Fixed Roof Type: **horizontal tank**
- Average outage, $H_{VO}$: **2.06167061** ft
- Max Vent Setting: **0.03** psig
- Min Vent Setting: **-0.03** psig

shell color: **white paint**
shell condition: **good**
shell alpha: **0.17**
roof color: **white paint**
roof condition: **good**
roof alpha: **0.17**
effective roof height: **0** ft
Hvo: **2.06167** ft

Service Data:

- Service (stored liquid): **Diesel Additives and Dyes**
- Product Factor, $K_P$: **1**
- Reid VaporPressure: psi (if specified)
- ASTM Distillation Slope: (if specified)
- Molecular Weight, $M_V$: **130** lb/lb-mol
- Liquid Bulk Temp, Tb: **55.3** degrees F
- Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
- Liquid Bulk Temp Basis? calculated from ambient, per AP-42 equation 1-28
- Liquid Surface Temp, T: **57.3** degrees F per AP-42 equation 1-26
- True Vapor Pressure, P: **0.0078** psia per AP-42 equation 1-25
- Stock Vapor Density, $W_V$: **0.00018** $lb/ft^3$ per AP-42 equation 1-21

Vapor Pressure Constants:
A: **2.20025**
B: **237.181**
C: **77.3334**

Heating Cycles:

- Max Liquid Bulk Temp: degrees F
- Min Liquid Bulk Temp: degrees F
- Heating cycle frequency: days

Operational Data:

- Throughput: **131** bbl per month
- Days this Period: **30** days
- Turnover Rate: **33.5** turnovers per year
- Turnover Factor, $K_N$: **1.000**

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 63.27 deg F Pvx = 0.010 psia

Tln = 51.40 deg F Pvn = 0.006 psia

$\Delta P_V$ = **0.0033656** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419705**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9991487**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979091**

Emissions Estimate for: **April 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **0.06** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **0.13** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **0.19** | lb per | month | AP-42 eqn 1-1 |
| | **0.0** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0106** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00024** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.013 psia

Tln = 59.98 deg F — Pvn = 0.009 psia

$\Delta P_V$ = **0.0043052** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0434002**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9988452**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979087**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.09** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.18** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.26** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **Horizontal** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **12.666** | ft |
| Tank Height: | **4.12334** | ft |
| Maximum Fill Height: | **3.1233395** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **2.1233395** | ft |
| Fixed Roof Type: | **horizontal tank** | |
| Average outage, $H_{VO}$: | **2.06167061** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0** ft |
| Hvo: | **2.06167** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | | psi | (if specified) |
| ASTM Distillation Slope: | | | (if specified) |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0133** | psia | per AP-42 equation 1-25 |
| Stock Vapor Density, $W_V$: | **0.00030** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A: **2.20025**
B: **237.181**
C: **77.3334**

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **33.5** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V =$ 24.115272 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 79.45 deg F Pvx = 0.016 psia

Tln = 67.39 deg F Pvn = 0.011 psia

$\Delta P_V =$ **0.0048251** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0413819**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S =$ **0.9985518**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **0.9979083**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.10** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.22** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.32** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.666** ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **74.7** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **77.1** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0148** psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00033** lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F; Pvx = 0.017 psia

Tln = 71.47 deg F; Pvn = 0.013 psia

$\Delta P_V$ = **0.0048574** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0383647**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9983842**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979081**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.10** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.25** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.35** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00032** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.017 psia
Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.004536** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366738**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9984486**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979082**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.09** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.24** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.33** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0117** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00027** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **33.5** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F    Pvx = 0.014 psia

Tln = 64.01 deg F    Pvn = 0.010 psia

$\Delta P_V$ = **0.0039897** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368662**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9987202**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979086**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.08** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.20** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.27** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **Horizontal** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **12.666** | ft |
| Tank Height: | **4.12334** | ft |
| Maximum Fill Height: | **3.1233395** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **2.1233395** | ft |
| Fixed Roof Type: | **horizontal tank** | |
| Average outage, $H_{VO}$: | **2.06167061** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0** ft |
| Hvo: | **2.06167** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | | psi | (if specified) |
| ASTM Distillation Slope: | | | (if specified) |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **0.0078** | psia | per AP-42 equation 1-25 |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/$ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A: **2.20025**
B: **237.181**
C: **77.3334**

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 62.75 deg F Pvx = 0.009 psia

Tln = 52.27 deg F Pvn = 0.006 psia

$\Delta P_V$ = **0.0029813** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365277**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9991433**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979091**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.05** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.14** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.19** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0053** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00013** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **33.5** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F    Pvx = 0.006 psia

Tln = 43.16 deg F    Pvn = 0.004 psia

$\Delta P_V$ = **0.0018383** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0291298**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9994208**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979095**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.03** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.09** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.12** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-300**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.666** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.12334** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.1233395** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.1233395** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.06167061** | ft | Hvo: | **2.06167** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0034** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00008** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **131** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **32.4** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0011878** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253976**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9996234**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979098**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.02** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.06** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.08** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, ΔTa: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** ft | | shell alpha: | **0.17** |
| Tank Height: | **6.28319** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0177** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00044** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V =$ 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.021 psia

Tln = 28.91 deg F — Pvn = 0.015 psia

$\Delta P_V =$ **0.0060457** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0277979**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S =$ **0.9970578**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **0.9979077**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.20** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.19** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.39** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** ft | | shell alpha: | **0.17** |
| Tank Height: | **6.28319** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0206** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00050** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **7.8** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 0.025 psia

Tln = 32.03 deg F — Pvn = 0.017 psia

$\Delta P_V$ = **0.0074553** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0308142**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.996579**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979073**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.23** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.22** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.45** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, ΔTa: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0323** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00077** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 0.039 psia

Tln = 42.41 deg F — Pvn = 0.026 psia

$\Delta P_V$ = **0.012606** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0375102**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.994649**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979056**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.48** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.34** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.81** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / ft$^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **14.7399** ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **55.3** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.3** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0458** psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00107** lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **7.3** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 63.27 deg F Pvx = 0.056 psia

Tln = 51.40 deg F Pvn = 0.037 psia

$\Delta P_V$ = **0.0186526** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0430304**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9924258**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979036**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.74** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.47** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1.21** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0613** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00141** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 0.074 psia

Tln = 59.98 deg F — Pvn = 0.050 psia

$\Delta P_V$ = **0.0240597** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0447713**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9898951**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979013**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **1.04** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.61** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1.65** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0764** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00174** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **7.3** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 0.091 psia

Tln = 67.39 deg F — Pvn = 0.064 psia

$\Delta P_V$ = **0.0272511** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0429386**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9874353**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9978991**

| Emissions Estimate for: | **June 2019** | | |
|---|---|---|---|
| Standing Storage Loss: | **1.18** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.76** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1.94** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0851** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00192** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 82.80 deg F Pvx = 0.100 psia

Tln = 71.47 deg F Pvn = 0.072 psia

$\Delta P_V$ = **0.0276111** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0399435**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9860228**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9978978**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **1.26** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.84** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **2.09** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0818** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00185** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 81.16 deg F Pvx = 0.095 psia

Tln = 70.31 deg F Pvn = 0.070 psia

$\Delta P_V$ = **0.0257173** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0381424**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9865665**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9978983**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **1.16** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.81** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **1.96** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0677** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00155** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **78** | bbl per | month |
| Days this Period: | **30** | days | |
| Turnover Rate: | **7.3** | turnovers per year | |
| Turnover Factor, $K_N$: | **1.000** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 74.80 deg F Pvx = 0.080 psia

Tln = 64.01 deg F Pvn = 0.057 psia

$\Delta P_V$ = **0.0223892** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0381413**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9888488**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979004**

Emissions Estimate for: **September 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **0.94** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **0.67** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **1.62** | lb per | month | AP-42 eqn 1-1 |
| | **0.0** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0461** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00108** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.055 psia

Tln = 52.27 deg F — Pvn = 0.038 psia

$\Delta P_V$ = **0.0165224** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0374653**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9923808**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979035**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.67** lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **0.47** lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **1.14** lb per | month | AP-42 eqn 1-1 |
| | **0.0** tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** | ft | shell alpha: | **0.17** |
| Tank Height: | **6.28319** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0320** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00077** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **7.3** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F — Pvx = 0.037 psia

Tln = 43.16 deg F — Pvn = 0.027 psia

$\Delta P_V$ = **0.0101757** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0297055**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9946925**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979056**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.36** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **0.33** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **0.70** lb per month | | AP-42 eqn 1-1 |
| | **0.0** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **AA-1-301**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **14.7399** ft | | shell alpha: | **0.17** |
| Tank Height: | **6.28319** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **5.283184** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **4.283184** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **3.14159331** | ft | Hvo: | **3.14159** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Lubricity Additive** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **3.50968** |
| ASTM Distillation Slope: | | | (if specified) | B: **367.471** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **103.145** |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0217** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00053** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **78** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **7.0** | turnovers per year |
| Turnover Factor, $K_N$: | **1.000** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 41.23 deg F Pvx = 0.025 psia

Tln = 33.90 deg F Pvn = 0.019 psia

$\Delta P_V$ = **0.0066482** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0257741**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053 P H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9963945**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **0.9979071**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.23** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.23** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.46** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0027** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00007** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 0.003 psia

Tln = 28.91 deg F — Pvn = 0.002 psia

$\Delta P_V$ = **0.0010683** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0274543**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9997723**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.00** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.05** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.06** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0032** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00008** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **2,083.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.181** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 0.004 psia

Tln = 32.03 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0013287** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0303909**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9997296**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.00** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.06** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.07** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0054** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 0.007 psia

Tln = 42.41 deg F — Pvn = 0.004 psia

$\Delta P_V$ = **0.0022772** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0367952**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9995546**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.10** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.11** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0078** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00018** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **1,944.8** | turnovers per year |
| Turnover Factor, $K_N$: | **0.182** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F — Pvx = 0.010 psia

Tln = 51.40 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0033656** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0419705**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9993513**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.15** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.15** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, ΔTa: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0106** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00024** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 72.41 deg F Pvx = 0.013 psia

Tln = 59.98 deg F Pvn = 0.009 psia

$\Delta P_V$ = **0.0043052** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0434002**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9991199**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.19** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.21** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** ft | | shell alpha: | **0.17** |
| Tank Height: | **3.14159** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0133** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00030** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **1,944.8** | turnovers per year |
| Turnover Factor, $K_N$: | **0.182** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 79.45 deg F Pvx = 0.016 psia

Tln = 67.39 deg F Pvn = 0.011 psia

$\Delta P_V$ = **0.0048251** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0413819**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053 P H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9988962**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.24** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.25** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0148** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00033** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V =$ 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F — Pvx = 0.017 psia

Tln = 71.47 deg F — Pvn = 0.013 psia

$\Delta P_V =$ **0.0048574** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.0383647**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S =$ **0.9987684**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.27** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.28** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0142** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00032** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 0.017 psia

Tln = 70.31 deg F — Pvn = 0.012 psia

$\Delta P_V$ = **0.004536** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0366738**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9988176**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.26** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.27** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0117** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00027** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **780** | bbl per | month |
| Days this Period: | **30** | days | |
| Turnover Rate: | **1,944.8** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.182** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 74.80 deg F Pvx = 0.014 psia

Tln = 64.01 deg F Pvn = 0.010 psia

$\Delta P_V$ = **0.0039897** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0368662**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9990246**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **0.21** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **0.23** | lb per | month | AP-42 eqn 1-1 |
| | **0.0** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0078** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00018** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 0.009 psia

Tln = 52.27 deg F — Pvn = 0.006 psia

$\Delta P_V$ = **0.0029813** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0365277**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.9993472**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.01** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.15** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.15** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0053** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00013** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **1,944.8** | turnovers per year |
| Turnover Factor, $K_N$: | **0.182** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 51.58 deg F Pvx = 0.006 psia

Tln = 43.16 deg F Pvn = 0.004 psia

$\Delta P_V$ = **0.0018383** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0291298**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.9995586**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.00** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **0.10** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **0.11** lb per month | | AP-42 eqn 1-1 |
| | **0.0** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **RA-1-302**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **5.52791** | ft | shell alpha: | **0.17** |
| Tank Height: | **3.14159** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **2.141592** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **1.141592** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **1.57079665** | ft | Hvo: | **1.5708** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Diesel Additives and Dyes** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | | psi | (if specified) | A: **2.20025** |
| ASTM Distillation Slope: | | | (if specified) | B: **237.181** |
| Molecular Weight, $M_V$: | **130** | lb/lb-mol | | C: **77.3334** |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **0.0034** | psia | per AP-42 equation 1-25 | |
| Stock Vapor Density, $W_V$: | **0.00008** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **780** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **1,882.1** | turnovers per year |
| Turnover Factor, $K_N$: | **0.183** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 0.004 psia

Tln = 33.90 deg F — Pvn = 0.003 psia

$\Delta P_V$ = **0.0011878** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0253976**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.999713**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **0.00** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **0.07** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **0.07** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **2.9717** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.03711** | lb/ft$^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F    Pvx = 3.230 psia

Tln = 28.91 deg F    Pvn = 2.731 psia

$\Delta P_V$ = **0.4991216** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.070243**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7520741**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.14** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **63.59** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **71.73** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **3.2045** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03974** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **759.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.206** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 40.59 deg F Pvx = 3.507 psia

Tln = 32.03 deg F Pvn = 2.923 psia

$\Delta P_V$ = **0.583873** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0815917**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.7377438**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.97** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **66.72** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **75.68** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0524** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04913** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 4.498 psia

Tln = 42.41 deg F — Pvn = 3.643 psia

$\Delta P_V$ = **0.8548278** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1181921**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6898693**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **16.63** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **84.19** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **100.82** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9235** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05857** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F — Pvx = 5.523 psia

Tln = 51.40 deg F — Pvn = 4.377 psia

$\Delta P_V$ = **1.1464801** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1614783**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.646754**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **24.57** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **99.69** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **124.25** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **Horizontal** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **9.02421** | ft |
| Tank Height: | **4.18617** | ft |
| Maximum Fill Height: | **3.18617134** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **2.18617134** | ft |
| Fixed Roof Type: | **horizontal tank** | |
| Average outage, $H_{VO}$: | **2.09308654** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0** ft |
| Hvo: | **2.09309** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **5.8396** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.06830** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A:
B:
C:

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 6.560 psia

Tln = 59.98 deg F — Pvn = 5.184 psia

$\Delta P_V$ = **1.3766272** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2024357**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6068684**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **34.82** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **117.03** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **151.85** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.6833** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07711** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 7.459 psia

Tln = 67.39 deg F — Pvn = 5.973 psia

$\Delta P_V$ = **1.4864789** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2318818**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5742513**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **41.24** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **131.23** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **172.47** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **7.1535** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08196** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F — Pvx = 7.921 psia

Tln = 71.47 deg F — Pvn = 6.446 psia

$\Delta P_V$ = **1.4744047** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2394158**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5575497**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **45.40** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **140.44** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **185.84** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.9735** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08011** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 7.693 psia

Tln = 70.31 deg F — Pvn = 6.309 psia

$\Delta P_V$ = **1.3840274** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2206278**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5638264**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **41.36** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **137.26** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **178.62** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.2029** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07211** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F — Pvx = 6.855 psia

Tln = 64.01 deg F — Pvn = 5.602 psia

$\Delta P_V$ = **1.2529356** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1876366**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5923778**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **32.19** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **122.73** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **154.92** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9404** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05875** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 5.468 psia

Tln = 52.27 deg F — Pvn = 4.454 psia

$\Delta P_V$ = **1.0141625** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1421721**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6459728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **22.39** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **100.67** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **123.06** lb per month | | AP-42 eqn 1-1 |
| | **0.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0345** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04894** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 51.58 deg F  Pvx = 4.392 psia

Tln = 43.16 deg F  Pvn = 3.700 psia

$\Delta P_V$ = **0.6919818** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0945991**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.6908187**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **12.84** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **83.29** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **96.14** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **Horizontal** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **9.02421** | ft |
| Tank Height: | **4.18617** | ft |
| Maximum Fill Height: | **3.18617134** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **2.18617134** | ft |
| Fixed Roof Type: | **horizontal tank** | |
| Average outage, $H_{VO}$: | **2.09308654** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0** ft |
| Hvo: | **2.09309** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **3.2912** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.04071** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A:
B:
C:

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 3.555 psia

Tln = 33.90 deg F — Pvn = 3.043 psia

$\Delta P_V$ = **0.5116238** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0704309**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.732547**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.72** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **69.75** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **78.47** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ____
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** psi | (if specified) | A: ____ |
| ASTM Distillation Slope: | **3** | (if specified) | B: ____ |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: ____ |
| Liquid Bulk Temp, Tb: | **32.0** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **32.8** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **2.9717** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03711** $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | ____ | degrees F |
| Min Liquid Bulk Temp: | ____ | degrees F |
| Heating cycle frequency: | ____ | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 3.230 psia

Tln = 28.91 deg F — Pvn = 2.731 psia

$\Delta P_V$ = **0.4991216** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.070243**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7520741**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.14** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **63.59** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **71.73** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **3.2045** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.03974** | lb/ft$^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **759.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.206** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 3.507 psia

Tln = 32.03 deg F — Pvn = 2.923 psia

$\Delta P_V$ = **0.583873** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0815917**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7377438**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.97** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **66.72** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **75.68** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0524** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04913** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 4.498 psia

Tln = 42.41 deg F — Pvn = 3.643 psia

$\Delta P_V$ = **0.8548278** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1181921**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6898693**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **16.63** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **84.19** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **100.82** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

- Avg Atmos Pressure, Pa: **14.326** psia
- Avg Ambient Temp, Taa: **55.3** degrees F
- Avg Daily Temp Range, $\Delta$Ta: **23** degrees F
- Avg Daily Solar Insolation, I: **1509.25339** Btu / $ft^2$ day

Tank Data:

- Tank Type: **Horizontal**
- Average alpha: **0.17**
- Tank Diameter: **9.02421** ft
- Tank Height: **4.18617** ft
- Maximum Fill Height: **3.18617134** ft
- Minimum Liquid Level: **1** ft
- Net Working Height: **2.18617134** ft
- Fixed Roof Type: **horizontal tank**
- Average outage, $H_{VO}$: **2.09308654** ft
- Max Vent Setting: **0.03** psig
- Min Vent Setting: **-0.03** psig

shell color: **white paint**
shell condition: **good**
shell alpha: **0.17**
roof color: **white paint**
roof condition: **good**
roof alpha: **0.17**
effective roof height: **0** ft
Hvo: **2.09309** ft

Service Data:

- Service (stored liquid): **Gasoline RVP_X**
- Product Factor, $K_P$: **1**
- Reid VaporPressure: **10** psi (if specified)
- ASTM Distillation Slope: **3** (if specified)
- Molecular Weight, $M_V$: **66** lb/lb-mol
- Liquid Bulk Temp, Tb: **55.3** degrees F
- Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
- Liquid Bulk Temp Basis? calculated from ambient, per AP-42 equation 1-28
- Liquid Surface Temp, T: **57.3** degrees F per AP-42 equation 1-26
- True Vapor Pressure, P: **4.9235** psia per AP-42 equation 1-24
- Stock Vapor Density, $W_V$: **0.05857** $lb/ft^3$ per AP-42 equation 1-21

Vapor Pressure Constants:
A:
B:
C:

Heating Cycles:

- Max Liquid Bulk Temp: degrees F
- Min Liquid Bulk Temp: degrees F
- Heating cycle frequency: days

Operational Data:

- Throughput: **1,451** bbl per month
- Days this Period: **30** days
- Turnover Rate: **708.6** turnovers per year
- Turnover Factor, $K_N$: **0.209**

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 63.27 deg F Pvx = 5.523 psia
Tln = 51.40 deg F Pvn = 4.377 psia

$\Delta P_V$ = **1.1464801** psia
$\Delta P_B$ = 0.06 psi; vent setting range
$K_E$ = **0.1614783**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.646754**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting
$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **24.57** lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **99.69** lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **124.25** lb per | month | AP-42 eqn 1-1 |
| | **0.1** tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **5.8396** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.06830** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F — Pvx = 6.560 psia

Tln = 59.98 deg F — Pvn = 5.184 psia

$\Delta P_V$ = **1.3766272** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2024357**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6068684**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **34.82** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **117.03** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **151.85** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**



The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.6833** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07711** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **1,451** | bbl per | month |
| Days this Period: | **30** | days | |
| Turnover Rate: | **708.6** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.209** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 7.459 psia

Tln = 67.39 deg F — Pvn = 5.973 psia

$\Delta P_V$ = **1.4864789** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2318818**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5742513**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **41.24** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **131.23** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **172.47** | lb per | month | AP-42 eqn 1-1 |
| | **0.1** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **7.1535** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08196** | lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 82.80 deg F Pvx = 7.921 psia
Tln = 71.47 deg F Pvn = 6.446 psia

$\Delta P_V$ = **1.4744047** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2394158**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.5575497**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **45.40** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **140.44** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **185.84** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.9735** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08011** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 7.693 psia

Tln = 70.31 deg F — Pvn = 6.309 psia

$\Delta P_V$ = **1.3840274** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2206278**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5638264**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **41.36** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **137.26** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **178.62** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, ΔTa: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.2029** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07211** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F — Pvx = 6.855 psia

Tln = 64.01 deg F — Pvn = 5.602 psia

$\Delta P_V$ = **1.2529356** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1876366**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5923778**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **32.19** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **122.73** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **154.92** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9404** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05875** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 62.75 deg F Pvx = 5.468 psia

Tln = 52.27 deg F Pvn = 4.454 psia

$\Delta P_V$ = **1.0141625** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1421721**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.6459728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **22.39** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **100.67** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **123.06** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0345** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04894** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F — Pvx = 4.392 psia

Tln = 43.16 deg F — Pvn = 3.700 psia

$\Delta P_V$ = **0.6919818** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0945991**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6908187**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **12.84** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **83.29** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **96.14** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-KDF3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **9.02421** ft | | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) A: |
| ASTM Distillation Slope: | **3** | | (if specified) B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **3.2912** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.04071** | $lb/ft^3$ | per AP-42 equation 1-21 |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **1,451** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 41.23 deg F Pvx = 3.555 psia

Tln = 33.90 deg F Pvn = 3.043 psia

$\Delta P_V$ = **0.5116238** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0704309**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.732547**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **8.72** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **69.75** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **78.47** | lb per month | AP-42 eqn 1-1 |
| | **0.0** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, ΔTa: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **32.8** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **2.9717** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03711** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 3.230 psia

Tln = 28.91 deg F — Pvn = 2.731 psia

$\Delta P_V$ = **0.4991216** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.070243**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7520741**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **January 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **16.27** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **127.18** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **143.46** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **36.3** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **3.2045** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03974** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **759.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.206** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 40.59 deg F — Pvx = 3.507 psia

Tln = 32.03 deg F — Pvn = 2.923 psia

$\Delta P_V$ = **0.583873** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0815917**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7377438**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **17.93** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **133.44** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **151.37** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, ΔTa: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | |
|---|---|---|
| Tank Type: | **Horizontal** | |
| Average alpha: | **0.17** | |
| Tank Diameter: | **12.7622** | ft |
| Tank Height: | **4.18617** | ft |
| Maximum Fill Height: | **3.18617134** | ft |
| Minimum Liquid Level: | **1** | ft |
| Net Working Height: | **2.18617134** | ft |
| Fixed Roof Type: | **horizontal tank** | |
| Average outage, $H_{VO}$: | **2.09308654** | ft |
| Max Vent Setting: | **0.03** | psig |
| Min Vent Setting: | **-0.03** | psig |

| | |
|---|---|
| shell color: | **white paint** |
| shell condition: | **good** |
| shell alpha: | **0.17** |
| roof color: | **white paint** |
| roof condition: | **good** |
| roof alpha: | **0.17** |
| effective roof height: | **0** ft |
| Hvo: | **2.09309** ft |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, P: | **4.0524** | psia | per AP-42 equation 1-24 |
| Stock Vapor Density, $W_V$: | **0.04913** | $lb/ft^3$ | per AP-42 equation 1-21 |

Vapor Pressure Constants:
A:
B:
C:

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F    Pvx = 4.498 psia
Tln = 42.41 deg F    Pvn = 3.643 psia

$\Delta P_V$ = **0.8548278** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1181921**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6898693**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **33.25** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **168.38** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **201.63** lb per month | | AP-42 eqn 1-1 |
| | **0.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.3** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9235** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05857** $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 63.27 deg F   Pvx = 5.523 psia

Tln = 51.40 deg F   Pvn = 4.377 psia

$\Delta P_V$ = **1.1464801** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1614783**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.646754**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **49.13** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **199.37** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **248.51** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, ΔTa: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **5.8396** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.06830** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V =$ 24.868619 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 72.41 deg F Pvx = 6.560 psia

Tln = 59.98 deg F Pvn = 5.184 psia

$\Delta P_V =$ **1.3766272** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.2024357**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S =$ **0.6068684**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **69.64** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **234.05** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **303.70** lb per month | | AP-42 eqn 1-1 |
| | **0.2** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **70.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **73.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.6833** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07711** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 79.45 deg F — Pvx = 7.459 psia

Tln = 67.39 deg F — Pvn = 5.973 psia

$\Delta P_V$ = **1.4864789** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2318818**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5742513**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **82.47** lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **262.47** lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **344.94** lb per | month | AP-42 eqn 1-1 |
| | **0.2** tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks** 

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **7.1535** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08196** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V =$ 22.662741 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 82.80 deg F Pvx = 7.921 psia

Tln = 71.47 deg F Pvn = 6.446 psia

$\Delta P_V =$ **1.4744047** psia

$\Delta P_B =$ 0.06 psi; vent setting range

$K_E =$ **0.2394158**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S =$ **0.5575497**

Vent Setting Correction Factor, $K_B$:

$K_B =$ 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP} =$ 0.03 psig; vent pressure setting

$P_I =$ 0 psig; initial gauge pressure (nominal operating pressure)

$K_B =$ **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **90.81** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **280.87** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **371.68** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.9735** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08011** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 7.693 psia

Tln = 70.31 deg F — Pvn = 6.309 psia

$\Delta P_V$ = **1.3840274** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2206278**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5638264**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **82.71** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **274.52** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **357.23** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.2029** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07211** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F — Pvx = 6.855 psia

Tln = 64.01 deg F — Pvn = 5.602 psia

$\Delta P_V$ = **1.2529356** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1876366**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5923778**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

| Emissions Estimate for: | **September 2019** | | |
|---|---|---|---|
| Standing Storage Loss: | **64.38** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **245.45** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **309.83** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **57.5** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9404** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05875** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | | |
|---|---|---|---|
| Throughput: | **2,901** | bbl per | month |
| Days this Period: | **31** | days | |
| Turnover Rate: | **685.7** | turnovers per year | |
| Turnover Factor, $K_N$: | **0.210** | | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 5.468 psia

Tln = 52.27 deg F — Pvn = 4.454 psia

$\Delta P_V$ = **1.0141625** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1421721**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6459728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | | |
|---|---|---|---|---|
| Standing Storage Loss: | **44.79** | lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **201.34** | lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **246.12** | lb per | month | AP-42 eqn 1-1 |
| | **0.1** | tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-2**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0345** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04894** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 51.58 deg F — Pvx = 4.392 psia

Tln = 43.16 deg F — Pvn = 3.700 psia

$\Delta P_V$ = **0.6919818** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0945991**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6908187**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **25.69** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **166.58** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **192.27** lb per month | | AP-42 eqn 1-1 |
| | **0.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: ____

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **T-M-2**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, ΔTa: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: ____ |
| ASTM Distillation Slope: | **3** | | (if specified) | B: ____ |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: ____ |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **3.2912** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04071** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | ____ | degrees F |
| Min Liquid Bulk Temp: | ____ | degrees F |
| Heating cycle frequency: | ____ | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 41.23 deg F — Pvx = 3.555 psia

Tln = 33.90 deg F — Pvn = 3.043 psia

$\Delta P_V$ = **0.5116238** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0704309**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.732547**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **17.43** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **139.51** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **156.94** lb per month | | AP-42 eqn 1-1 |
| | **0.1** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **31.95** | degrees F |
| Avg Daily Temp Range, ΔTa: | **17.5** | degrees F |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **32.0** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **32.8** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **2.9717** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03711** $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 15.54641 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 36.68 deg F — Pvx = 3.230 psia

Tln = 28.91 deg F — Pvn = 2.731 psia

$\Delta P_V$ = **0.4991216** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.070243**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.7520741**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

| Emissions Estimate for: | **January 2019** | | |
|---|---|---|---|
| Standing Storage Loss: | **16.27** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **127.18** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **143.46** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **35.15** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.1** | degrees F |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_P$: | **1** | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **35.2** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **36.3** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **3.2045** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.03974** lb/$ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **28** | days |
| Turnover Rate: | **759.2** | turnovers per year |
| Turnover Factor, $K_N$: | **0.206** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 17.105023 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 40.59 deg F Pvx = 3.507 psia

Tln = 32.03 deg F Pvn = 2.923 psia

$\Delta P_V$ = **0.583873** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0815917**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.7377438**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **February 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **17.93** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **133.44** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **151.37** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **21** | degrees F |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0524** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04913** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.709269 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 52.77 deg F — Pvx = 4.498 psia

Tln = 42.41 deg F — Pvn = 3.643 psia

$\Delta P_V$ = **0.8548278** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1181921**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6898693**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **March 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **33.25** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **168.38** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **201.63** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **55.3** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **23** | degrees F |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **55.3** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.3** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9235** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05857** $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 23.744046 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 63.27 deg F — Pvx = 5.523 psia

Tln = 51.40 deg F — Pvn = 4.377 psia

$\Delta P_V$ = **1.1464801** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1614783**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.646754**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **April 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **49.13** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **199.37** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **248.51** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **63.8** | degrees F |
| Avg Daily Temp Range, ΔTa: | **22.8** | degrees F |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **66.2** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **5.8396** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.06830** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.868619 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 72.41 deg F    Pvx = 6.560 psia
Tln = 59.98 deg F    Pvn = 5.184 psia

$\Delta P_V$ = **1.3766272** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2024357**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6068684**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **May 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **69.64** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **234.05** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **303.70** lb per month | | AP-42 eqn 1-1 |
| | **0.2** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:
- Avg Atmos Pressure, Pa: **14.326** psia
- Avg Ambient Temp, Taa: **70.85** degrees F
- Avg Daily Temp Range, $\Delta$Ta: **20.9** degrees F
- Avg Daily Solar Insolation, I: **1904.88908** Btu / $ft^2$ day

Tank Data:
- Tank Type: **Horizontal**
- Average alpha: **0.17**
- Tank Diameter: **12.7622** ft
- Tank Height: **4.18617** ft
- Maximum Fill Height: **3.18617134** ft
- Minimum Liquid Level: **1** ft
- Net Working Height: **2.18617134** ft
- Fixed Roof Type: **horizontal tank**
- Average outage, $H_{VO}$: **2.09308654** ft
- Max Vent Setting: **0.03** psig
- Min Vent Setting: **-0.03** psig

- shell color: **white paint**
- shell condition: **good**
- shell alpha: **0.17**
- roof color: **white paint**
- roof condition: **good**
- roof alpha: **0.17**
- effective roof height: **0** ft
- Hvo: **2.09309** ft

Service Data:
- Service (stored liquid): **Gasoline RVP_X**
- Product Factor, $K_P$: **1**
- Reid VaporPressure: **10** psi (if specified)
- ASTM Distillation Slope: **3** (if specified)
- Molecular Weight, $M_V$: **66** lb/lb-mol
- Liquid Bulk Temp, Tb: **70.9** degrees F
- Constant Temp Tank? **NO** tank must be insulated for temperature to be constant
- Liquid Bulk Temp Basis? calculated from ambient, per AP-42 equation 1-28
- Liquid Surface Temp, T: **73.4** degrees F per AP-42 equation 1-26
- True Vapor Pressure, P: **6.6833** psia per AP-42 equation 1-24
- Stock Vapor Density, $W_V$: **0.07711** lb/$ft^3$ per AP-42 equation 1-21

Vapor Pressure Constants:
- A:
- B:
- C:

Heating Cycles:
- Max Liquid Bulk Temp: degrees F
- Min Liquid Bulk Temp: degrees F
- Heating cycle frequency: days

Operational Data:
- Throughput: **2,901** bbl per month
- Days this Period: **30** days
- Turnover Rate: **708.6** turnovers per year
- Turnover Factor, $K_N$: **0.209**

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 24.115272 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 79.45 deg F Pvx = 7.459 psia

Tln = 67.39 deg F Pvn = 5.973 psia

$\Delta P_V$ = **1.4864789** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2318818**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.5742513**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **June 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **82.47** lb per | month | AP-42 eqn 1-4 |
| Working Loss: | **262.47** lb per | month | AP-42 eqn 1-35 |
| Total Emissions: | **344.94** lb per | month | AP-42 eqn 1-1 |
| | **0.2** tons per | month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **74.65** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **19.3** | degrees F |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / ft$^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **77.1** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **7.1535** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08196** | lb/ft$^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 22.662741 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 82.80 deg F    Pvx = 7.921 psia

Tln = 71.47 deg F    Pvn = 6.446 psia

$\Delta P_V$ = **1.4744047** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2394158**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5575497**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **July 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **90.81** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **280.87** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **371.68** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **73.5** | degrees F |
| Avg Daily Temp Range, ΔTa: | **19.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **75.7** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.9735** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.08011** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.710292 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 81.16 deg F — Pvx = 7.693 psia

Tln = 70.31 deg F — Pvn = 6.309 psia

$\Delta P_V$ = **1.3840274** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.2206278**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5638264**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **August 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **82.71** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **274.52** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **357.23** | lb per month | AP-42 eqn 1-1 |
| | **0.2** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **67.55** | degrees F |
| Avg Daily Temp Range, ΔTa: | **20.9** | degrees F |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **69.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **6.2029** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.07211** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 21.575107 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 74.80 deg F  Pvx = 6.855 psia
Tln = 64.01 deg F  Pvn = 5.602 psia

$\Delta P_V$ = **1.2529356** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1876366**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.5923778**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **September 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **64.38** lb per month | | AP-42 eqn 1-4 |
| Working Loss: | **245.45** lb per month | | AP-42 eqn 1-35 |
| Total Emissions: | **309.83** lb per month | | AP-42 eqn 1-1 |
| | **0.2** tons per month | | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **56.1** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **22.2** | degrees F |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day |

Tank Data:

| | | | |
|---|---|---|---|
| Tank Type: | **Horizontal** | shell color: | **white paint** |
| Average alpha: | **0.17** | shell condition: | **good** |
| Tank Diameter: | **12.7622** ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** ft | | |
| Fixed Roof Type: | **horizontal tank** | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** psig | | |
| Min Vent Setting: | **-0.03** psig | | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | |
| Reid VaporPressure: | **10** psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **56.1** degrees F | | |
| Constant Temp Tank? | **NO** | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, T: | **57.5** degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.9404** psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.05875** $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ — AP-42 eqn 1-7

where:

$\Delta T_V$ = 20.951065 deg F (deg R); daily temperature range in the vapor space — AP-42 eqn 1-8

Tlx = 62.75 deg F — Pvx = 5.468 psia

Tln = 52.27 deg F — Pvn = 4.454 psia

$\Delta P_V$ = **1.0141625** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.1421721**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ — AP-42 eqn 1-20

$K_S$ = **0.6459728**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N\ [(P_{BP} + P_A) / (P_I + P_A)] > 1$ — AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ — AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **October 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **44.79** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **201.34** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **246.12** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **46.45** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **18.9** | degrees F |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | |
| Product Factor, $K_P$: | **1** | | | Vapor Pressure Constants: |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **47.4** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **4.0345** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04894** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **30** | days |
| Turnover Rate: | **708.6** | turnovers per year |
| Turnover Factor, $K_N$: | **0.209** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 16.829268 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 51.58 deg F Pvx = 4.392 psia

Tln = 43.16 deg F Pvn = 3.700 psia

$\Delta P_V$ = **0.6919818** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0945991**

Vented Vapor Saturation Factor, $K_S = 1 / (1 + 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.6908187**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **November 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **25.69** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **166.58** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **192.27** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Fixed-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations,

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **T-M-3**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | |
|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia |
| Avg Ambient Temp, Taa: | **36.85** | degrees F |
| Avg Daily Temp Range, $\Delta$Ta: | **16.9** | degrees F |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day |

Tank Data:

| | | | | |
|---|---|---|---|---|
| Tank Type: | **Horizontal** | | shell color: | **white paint** |
| Average alpha: | **0.17** | | shell condition: | **good** |
| Tank Diameter: | **12.7622** | ft | shell alpha: | **0.17** |
| Tank Height: | **4.18617** | ft | roof color: | **white paint** |
| Maximum Fill Height: | **3.18617134** | ft | roof condition: | **good** |
| Minimum Liquid Level: | **1** | ft | roof alpha: | **0.17** |
| Net Working Height: | **2.18617134** | ft | | |
| Fixed Roof Type: | **horizontal tank** | | effective roof height: | **0** ft |
| Average outage, $H_{VO}$: | **2.09308654** | ft | Hvo: | **2.09309** ft |
| Max Vent Setting: | **0.03** | psig | | |
| Min Vent Setting: | **-0.03** | psig | | |

Service Data:

| | | | | |
|---|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | | Vapor Pressure Constants: |
| Product Factor, $K_P$: | **1** | | | |
| Reid VaporPressure: | **10** | psi | (if specified) | A: |
| ASTM Distillation Slope: | **3** | | (if specified) | B: |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | | C: |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant | |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | | |
| Liquid Surface Temp, T: | **37.6** | degrees F | per AP-42 equation 1-26 | |
| True Vapor Pressure, P: | **3.2912** | psia | per AP-42 equation 1-24 | |
| Stock Vapor Density, $W_V$: | **0.04071** | $lb/ft^3$ | per AP-42 equation 1-21 | |

Heating Cycles:

| | | |
|---|---|---|
| Max Liquid Bulk Temp: | | degrees F |
| Min Liquid Bulk Temp: | | degrees F |
| Heating cycle frequency: | | days |

Operational Data:

| | | |
|---|---|---|
| Throughput: | **2,901** | bbl per month |
| Days this Period: | **31** | days |
| Turnover Rate: | **685.7** | turnovers per year |
| Turnover Factor, $K_N$: | **0.210** | |

Calculated Values:

Vapor Space Expansion Factor, $K_E = \{\Delta T_V / (T + 459.57)\} + \{(\Delta P_V - \Delta P_B) / (P_A - P)\}$ AP-42 eqn 1-7

where:

$\Delta T_V$ = 14.67041 deg F (deg R); daily temperature range in the vapor space AP-42 eqn 1-8

Tlx = 41.23 deg F Pvx = 3.555 psia

Tln = 33.90 deg F Pvn = 3.043 psia

$\Delta P_V$ = **0.5116238** psia

$\Delta P_B$ = 0.06 psi; vent setting range

$K_E$ = **0.0704309**

Vented Vapor Saturation Factor, $K_S = 1 / (1+ 0.053\ P\ H_{VO})$ AP-42 eqn 1-20

$K_S$ = **0.732547**

Vent Setting Correction Factor, $K_B$:

$K_B$ = 1; except when:

$K_N [(P_{BP} + P_A) / (P_I + P_A)] > 1$ AP-42 eqn 1-36

$K_B = [(P_I + P_A)/K_N - P] / [P_{BP} + P_A - P]$ AP-42 eqn 1-37

where:

$P_{BP}$ = 0.03 psig; vent pressure setting

$P_I$ = 0 psig; initial gauge pressure (nominal operating pressure)

$K_B$ = **1**

Emissions Estimate for: **December 2019**

| | | | |
|---|---|---|---|
| Standing Storage Loss: | **17.43** | lb per month | AP-42 eqn 1-4 |
| Working Loss: | **139.51** | lb per month | AP-42 eqn 1-35 |
| Total Emissions: | **156.94** | lb per month | AP-42 eqn 1-1 |
| | **0.1** | tons per month | |

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **January 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **31.95** | degrees F | | |
| Avg Daily Solar Insolation, I: | **618.99377** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **328** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi $(Kv\ V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **95** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **423** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **32.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **32.8** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **4.820** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / $[1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1022** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **January 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **242.17** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **242.42** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **February 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **35.15** | degrees F | | |
| Avg Daily Solar Insolation, I: | **855.67719** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.6** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **328** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **95** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **423** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **35.2** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **36.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.176** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1116** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **February 2019**

Days This Period: **28**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **238.89** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **239.14** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ____________

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **WA-49-256**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **March 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1174.21627** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **342** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **97** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **439** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.0** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.458** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1487** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **March 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **365.80** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **366.05** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **April 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **55.3** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1509.25339** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.8** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **335** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **96** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **431** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **55.3** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.3** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.894** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1626** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **April 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **380.04** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **380.29** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **May 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **63.8** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1775.76019** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **6.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **281** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **90** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **370** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **63.8** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **66.2** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.202** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1123** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **May 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **233.22** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **233.47** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **June 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **70.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1904.88908** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **259** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **87** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **346** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **70.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **73.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.965** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1338** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **June 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **251.38** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **251.63** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **July 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **74.65** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1841.75235** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **245** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **330** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **74.7** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **77.1** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.391** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1466** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **July 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **271.38** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **271.63** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **August 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **73.5** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1656.78394** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.1** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb V^n) D] \times [P^* Mv Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^* Mv Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb V^n) D]$

Rim Seal Emission Factor (Fr): **238** lb-mol/yr

$Ld = [(Kd Sd) D^2] \times [P^* Mv Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^* Mv Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd Sd) D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^* Mv Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi (Kv V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **84** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **322** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **9** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **73.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **75.7** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.228** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1417** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **August 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **255.74** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **255.99** lb per month — per AP-42 equation 2-1

**0.1** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: ______

Location: **MPLX - Kenova - PTE**

Calculations for Tank No.: **WA-49-256**

Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **September 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **67.55** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1371.24094** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.3** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |

Rim Seal Type: **Mechanical-Shoe Primary with Rim-Mounted Secondary**

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2

Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr

Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **245** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9

Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd

Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5

Ffi = Nfi [Kfi] — per AP-42 equation 2-6

Kfi = [Kfai + Kfbi (Kv $V)^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **85** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **330** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **13.5** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **67.6** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **69.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **8.601** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - $Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.2254** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **September 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **403.65** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **403.90** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **October 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **56.1** | degrees F | | |
| Avg Daily Solar Insolation, I: | **1043.50103** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **5.9** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

Lr = [(Kra + Krb $V^n$) D] × [P* Mv Kc] — per AP-42 equation 2-2
Lr = [Fr] × [P* Mv Kc] — defining a Rim Seal Emission Factor, Fr
Fr = [(Kra + Krb $V^n$) D]

Rim Seal Emission Factor (Fr): **266** lb-mol/yr

Ld = [(Kd Sd) $D^2$] × [P* Mv Kc] — per AP-42 equation 2-9
Ld = [Fd] × [P* Mv Kc] — defining a Deck Seam Emission Factor, Fd
Fd = [(Kd Sd) $D^2$]

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

Lfi = [Ffi] × [P* Mv Kc] — per AP-42 equation 2-5
Ffi = Nfi [Kfi] — per AP-42 equation 2-6
Kfi = [Kfai + Kfbi (Kv V)$^{mi}$] — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **88** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **354** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **56.1** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **57.5** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **7.784** | psia | per AP-42 equation 1-24 |

P* = [Pva/Pa] / [1 + (1 - Pva/Pa)$^{0.5}$]$^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1935** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **October 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **384.35** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **384.60** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company: 
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **November 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **46.45** | degrees F | | |
| Avg Daily Solar Insolation, I: | **676.73691** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2

$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr

$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **306** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9

$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd

$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5

$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6

$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **93** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **399** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **46.5** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **47.4** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **6.431** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1479** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **November 2019**

Days This Period: **30**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **319.77** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **320.02** lb per month — per AP-42 equation 2-1

**0.2** tons per month

**Sample Calculation of Estimated Emissions - Floating-Roof Tanks**

The emissions estimates calculated below are based on EPA's AP-42 Chapter 7.1 (Nov 2006) emission factors and equations.

Company:
Location: **MPLX - Kenova - PTE**
Calculations for Tank No.: **WA-49-256**
Emission estimates per EPA's AP-42 Chapter 7.1 (Nov 2006), for: **December 2019**

Meteorological Data:

| | | | | |
|---|---|---|---|---|
| Avg Atmos Pressure, Pa: | **14.326** | psia | | |
| Avg Ambient Temp, Taa: | **36.85** | degrees F | | |
| Avg Daily Solar Insolation, I: | **525.71639** | Btu / $ft^2$ day | shell color: | **white paint** |
| Avg Wind Speed, V: | **7.4** | mph | shell condition: | **good** |

Tank Data:

| | | | | |
|---|---|---|---|---|
| | | | shell alpha: | **0.17** |
| Tank Type: | **EFRT** | | roof color: | **white paint** |
| Average alpha: | **0.17** | | roof condition: | **good** |
| Tank Diameter, D: | **90** | ft | roof alpha: | **0.17** |
| Rim Seal Type: | **Mechanical-Shoe Primary with Rim-Mounted Secondary** | | | |

$Lr = [(Kra + Krb\ V^n)\ D] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-2
$Lr = [Fr] \times [P^*\ Mv\ Kc]$ — defining a Rim Seal Emission Factor, Fr
$Fr = [(Kra + Krb\ V^n)\ D]$

Rim Seal Emission Factor (Fr): **320** lb-mol/yr

$Ld = [(Kd\ Sd)\ D^2] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-9
$Ld = [Fd] \times [P^*\ Mv\ Kc]$ — defining a Deck Seam Emission Factor, Fd
$Fd = [(Kd\ Sd)\ D^2]$

Deck Seam Emission Factor (Fd): **0** lb-mol/yr

$Lfi = [Ffi] \times [P^*\ Mv\ Kc]$ — per AP-42 equation 2-5
$Ffi = Nfi\ [Kfi]$ — per AP-42 equation 2-6
$Kfi = [Kfai + Kfbi\ (Kv\ V)^{mi}]$ — per AP-42 equation 2-7

| | | | |
|---|---|---|---|
| Guidepole Emission Factor (Ffgp): | **0** | lb-mol/yr | |
| Deck Fittings Emission Factor (Ffi-n): | **94** | lb-mol/yr | (all deck fittings other than the guidepole) |
| Total Emission Factors (Fr + Fd + Ff): | **415** | lb-mol/yr | |
| Number of columns, Nc: | **0** | | |
| Effective column diameter, Fc: | **1** | feet | |

Service Data:

| | | | |
|---|---|---|---|
| Service (stored liquid): | **Gasoline RVP_X** | | |
| Product Factor, $K_C$: | **1** | | |
| Reid VaporPressure: | **15** | psi | (if specified) |
| ASTM Distillation Slope: | **3** | | (if specified) |
| Molecular Weight, $M_V$: | **66** | lb/lb-mol | given |
| Liquid Bulk Temp, Tb: | **36.9** | degrees F | |
| Constant Temp Tank? | **NO** | | tank must be insulated for temperature to be constant |
| Liquid Bulk Temp Basis? | calculated from ambient, per AP-42 equation 1-28 | | |
| Liquid Surface Temp, Tla: | **37.6** | degrees F | per AP-42 equation 1-26 |
| True Vapor Pressure, Pva: | **5.308** | psia | per AP-42 equation 1-24 |

$P^* = [Pva/Pa] / [1 + (1 - Pva/Pa)^{0.5}]^2$

| | | | |
|---|---|---|---|
| Vapor Pressure Function, P*: | **0.1152** | dimensionless | per AP-42 equation 2-3 |
| Liquid density, Wl: | **5.6** | lb/gal | |
| Clingage factor, Cs: | **0.0015** | bbl per 1000 sq.ft. | |

Operational Data:

Throughput, Q: **2,850** bbl per month

Emissions Estimate for: **December 2019**

Days This Period: **31**

Standing Storage Loss (Lr + Ld + Lf) = [Fr + Fd + Ff] × [P* Mv Kc] — per AP-42 equations 2-2, 2-5, 2-9

**Standing Storage Loss:** **267.78** lb per month

Withdrawal Loss (Lwd) = [(0.943 Q Cs Wl)/D] × [1 + (Nc Fc)/D] — per AP-42 equation 2-4

**Withdrawal Loss:** **0.25** lb per month

**Total Emissions:** **268.03** lb per month — per AP-42 equation 2-1

**0.1** tons per month